

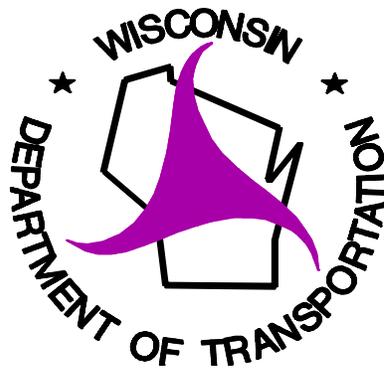
STATE OF WISCONSIN

DEPARTMENT OF TRANSPORTATION

Supplemental Specifications

amending the 1996 Edition of the
STANDARD SPECIFICATIONS
FOR
HIGHWAY AND STRUCTURE
CONSTRUCTION

1999 Edition



INTRODUCTION

Supplemental Specifications are issued annually. The Supplemental Specifications that apply to a proposal will be referenced in the General Special Provision of the proposal, but will not be bound into the proposal. Specification revisions made between the annual supplements will be issued as needed in Interim Supplemental Specifications. The Interim Supplemental Specification that applies to a proposal will be referenced in the General Special Provision of the proposal, but will not be bound into the proposal.

The annual Supplemental Specifications and each Interim Supplemental Specification will be distributed at no charge, by a continuing update service, to prequalified contractors, eligible engineering consulting firms, and selected WisDOT employees. There is no updating service for other users.

Prequalified contractors are responsible for obtaining sufficient copies of this document for bidding and contract management. They also are responsible for notifying their subcontractors and suppliers about the Supplemental Specifications and the Interim Supplemental Specifications that apply to a proposal.

Eligible engineering consulting firms are responsible for obtaining sufficient copies of this document for their personnel to fulfill their responsibilities under an engineering services contract with the Department.

The following specifications have been issued:

	Effective From	
	Letting	to Letting
1996 Standard Specifications	Oct. 1996	Until Superseded
1996 Supplemental Specifications	Oct. 1996	Oct. 1997
Interim Supplemental Specifications No. 1	Jan. 1997	Oct. 1997
1997 Supplemental Specifications	Oct. 1997	Oct. 1998
Interim Supplemental Specifications No. 1	June 1998	Oct. 1998
1998 Supplemental Specifications	Oct. 1998	Oct. 1999
Interim Supplemental Specifications No. 1	Feb. 1999	Oct. 1999
1999 Supplemental Specifications	Oct. 1999	Until Superseded

In this document we continue to use dual dimensioning for all new revisions while those changes published before 1998 Interim supplemental Specification No. 1 still have the metric units only. For dual dimensioned provisions, primary values are given in the U.S. Standard Measure system while the SI Metric system equivalents are shown in parentheses. Contracts with the plans and schedule of prices developed under the U.S. Standard Measure system, will be administered using the U.S. Standard Measure system values. Contracts with the plans and schedule of prices developed under the SI Metric system, will be administered using the SI Metric system values.

The current Supplemental Specifications and Interim Supplemental Specifications will be included free of charge with each Standard Specifications book issued or purchased. Address written requests for additional complimentary copies of the Supplemental Specifications to:

Wisconsin Department of Transportation
Bureau of Highway Construction, Room 601
P.O. Box 7916
Madison, WI 53707-7916

Free copies of the Annual and Interim Supplemental Specifications can be obtained, in person, in:
Room 601, Hill Farms Transportation Building, 4802 Sheboygan Avenue, Madison, Wisconsin.

PREFACE

Wisconsin Department Of Transportation
Division Of Transportation Infrastructure Development
Bureau Of Highway Construction
Standards Development Section

July, 1999

To: Specification Users

Subject: 1999 Supplemental Specifications amending the 1996 Standard Specifications for Highway and Structure Construction

Issued By: Jerry H. Zogg, P.E.
Chief Standards Development Engineer
Bureau of Highway Construction

These 1999 Supplemental Specifications amend the Standard Specifications for Highway and Structure Construction, 1996 Edition, and are considered part of those Standard Specifications, superseding conflicting provisions in the Standard Specifications applicable under the contract. Previously issued Supplemental Specifications and Interim Supplemental Specifications have been incorporated in this document. The 1999 Supplemental Specifications have been approved by the Federal Highway Administration and become effective with the October 12, 1999 letting, remaining in effect until superseded. Previously issued Supplemental Specifications and Interim Supplemental Specifications will no longer be in effect after October 12, 1999 unless referenced in previously let contracts.

This document was prepared by: Michael Hall
Chief Standards Development Engineer
Bureau of Highway Construction

The following preface section is provided to briefly describe specification revisions made since 1998 Interim Supplemental Specification No. 1. These descriptions are provided for the convenience of the user only, and are not contractually binding. Each new revision is listed by it's subsection number and title. Where a title has been revised, the listing gives the new title.

PREFACE

101 DEFINITIONS AND TERMS

Revise this section to correct an error in the definition of working day. Change the word "and" to "or" in the following phrase: "on which weather and other conditions". This change is in addition to other changes implemented in previous Supplemental Specifications.

107.17.3 Railroad Insurance Requirements

Revise this subsection to clarify the specific railroad liability insurance coverages that the contractor must provide when required by special provisions. Also revise to require the contractor to provide copies of those policies directly to the railroad as well as to the Department. This will not change the previous requirement that allows the contractor to begin work after the policy has been received by the Department. This set of revisions also incorporates a portion of the language previously repeated in four STSP's, 107-020, 107-025, 107-030, and 107-040.

108.8 Liquidated Damages

Revise the table to reflect the results of the 1998 survey of the actual daily costs incurred by WisDOT for administrative and inspection personnel on construction projects.

201.2 Construction Methods

Revise paragraph two to clarify that all stumps and their associated tap roots and feeder roots must be removed to at least one foot below the areas where subsequent grading operations will be conducted. For cut areas, one foot below the final subgrade. For embankment areas, one foot below the existing grade.

206.3.12 Backfill

Restructure this subsection to provide clarity and to allow the contractor to backfill the body of A3 abutments before the backwall is placed when the concrete has attained 2000 psi.

304.2.6 Gradation Requirements

Revise this subsection to remove the contractor option to use asphaltic concrete aggregate Gradation No. 3 in lieu of base course Gradation No. 3. The asphalt aggregate has a smaller top size and lower P200 and consequently tends to erode when used for unpaved shoulders.

304.2.7 Sampling and Testing

Because we now specify two different soundness tests, revise this subsection to indicate that AASHTO T 104 describes the sodium sulfate soundness test.

304.9.1 General

Revise paragraph six to clarify that the bid item Shaping Shoulders should be measured along each side of the traveled way. The measured length will thus be twice the length of the corresponding roadway.

PREFACE

307.3.1.3 Opening Concrete Base Course to Traffic

Retitle this subsection to "Opening Concrete Base Course to Traffic" and revise the content to define the opening criteria. The curing requirements for concrete base are already specified by reference in 307.1 to all the provisions of 415 for concrete pavements. The opening criteria for concrete base is the same as specified in 415.5.15 for Grade A concrete used in pavements, 3000 psi or 4 equivalent curing days, when no special precautions are taken. When the contractor takes measures to prevent loading within 6 inches of the edge, the engineer will allow earlier opening at 2000 psi or 3 equivalent curing days.

308.3.2 Concrete Patching

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing base patching concrete, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10.

308.5 Basis of Payment

Revise this paragraph to correct a wording error. Change the word "an" to "and" in the following phrase: "for preparing and testing concrete cylinders an providing test data".

401.2.3 General Requirements

Revise this paragraph to clarify that the Department can prohibit the use of crushed stone from limestone/dolomite deposits having thinly bedded strata or strata of a shaley nature; and the Department may also prohibit the use of aggregates, of any kind, from deposits or formations known to produce unsound material.

401.2.4 Sodium Sulfate Soundness

Retitle this subsection to "Sodium Sulfate Soundness" and revise this subsection to indicate that sodium sulfate soundness testing is required for coarse aggregates used in asphaltic mixtures. Also revise to clarify how to apply the standards and perform the tests when aggregate comes from more than one deposit or source.

401.2.7 Sampling and Testing

Revise this subsection to include the freeze/thaw soundness test method, AASHTO T 103, now required for targeted limestone/dolomite aggregates from specific geologic formations that have caused significant surface deterioration of asphalt pavements. Also revise this subsection to indicate that AASHTO T 104 describes the sodium sulfate soundness test.

407.2.1.1.2 Freeze-Thaw Soundness

Retitle this subsection to "Freeze-Thaw Soundness" and revise to provide for freeze-thaw soundness testing of problem limestone/dolomite aggregates from specific geologic formations that have caused significant surface deterioration of asphalt pavements. Freeze-thaw testing should provide for aggregates of suitable quality and make it possible to administer contracts without requiring a geologic investigation. Sodium sulfate soundness tests are still required as prescribed for all aggregates used in asphaltic mixtures in 401.2.4.

PREFACE

407.2.1.1.4 Aggregate Gradation Master Range

Revise this subsection to correct the units for the 600, 300, and 75 micron sieves. Change the units for these sieves from mm to μm .

415.2.2 Concrete

Revise paragraph two to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

415.2.5 Concrete Curing Agents

Revise this subsection to eliminate specifications for curing paper. This material is no longer used.

415.5.10 Curing of Concrete

Revise this subsection to eliminate the wet fabric and paper curing methods and add the impervious sheeting, continuous wet cure, and alternate methods. The contractor now has the option of using any of the specified methods and is responsible for maintaining moisture in the concrete until the opening strength is attained. See also revisions to 415.5.13 "Cold Weather Concreting" and 415.5.15 "Opening to Service".

415.5.13 Cold Weather Concreting

Retitle this subsection to "Cold Weather Concreting" and revise to implement a completely new set of provisions governing cold weather protection of concrete pavement. These new procedures: eliminate all date restrictions and replace with temperature criteria, maintain covering until opening strength is attained, and define required protection for specified temperature ranges.

415.5.15 Opening to Service

Retitle this subsection to "Opening to Service" and revise to implement a completely new set of provisions governing opening concrete pavement to service. These new procedures: allow opening at 3000 psi for both urban and rural pavements; base opening on contractor provided strength results; allow strength determination based on cylinders, cores, or a new method, maturity; define a new concept, equivalent curing days, to provide a temperature adjustment to the minimum time required to open if the contractor does not provide strength information.

416.2.6 Concrete Pavement Gaps

Revise this subsection to allow the contractor to use high early strength or 9-bag concrete to pave through gaps where paving through has been approved by the engineer. The 9-bag concrete must comply with the slump, air, and other requirements for the contiguous pavement.

416.3.1 Concrete Pavement Approach Slab

Delete paragraph five. Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing Concrete Pavement Approach Slab, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed in 415.5.10 for concrete pavement. These requirements are made by reference in 416.1 "Description".

PREFACE

416.3.7 Concrete Pavement Repair

Delete paragraph five and six. Curing and opening to traffic requirements for Concrete Pavement Repair are now the same as for concrete pavement where the duration of the curing period and opening to traffic are defined by the strength or time criteria in 415.5.15. These requirements are made by reference in 416.1 "Description".

416.3.8.5 (Vacant)

Delete this subsection. Curing requirements for Special High Early Strength Concrete Pavement Repair are now the same as for concrete pavement where the duration of the curing period is defined by the strength or time criteria in 415.5.15. These requirements are made by reference in 416.1 "Description".

416.3.9 Concrete Pavement Gaps

Revise this subsection to allow the contractor to pave through gaps where paving through has been approved by the engineer. As a part of this approval process the engineer may require the contractor to coordinate with, and obtain the full consent of, all abutting property owners and any affected local units of government.

416.3.10 Continuous Diamond Grinding

Revise paragraph six to eliminate a punctuation mistake.

416.5 Basis of Payment

Revise this subsection to provide for payment of the full contract price for gaps where the contractor either; obtains permission from the engineer to pave through gaps, or builds the gap as shown on the plans.

501.3.4.4 Non-Chloride Accelerating Admixtures

Add this new subsection, adopted from the Concrete Masonry QMP Specification, to specify the requirements for Type C or Type E non-chloride accelerating admixtures.

501.3.6.3.6 Size Requirements

Revise this subsection to alleviate producer problems with meeting the existing gradation requirements. These changes include: add P8 requirement of 80-100%, increase the P16 from 45-80% to 50-85%, and add P30 requirement of 25-60%. This new gradation is similar to the standard AASHTO M6 gradation except that we have retained the WisDOT P4 requirement of 90-100%.

501.3.6.4.4 Physical Properties

Revise this subsection to provide for freeze-thaw soundness testing of problem limestone/dolomite aggregates from specific geologic formations that have caused significant surface deterioration of concrete pavements and bridge decks. Freeze-thaw testing should provide for aggregates of suitable quality and make it possible to administer contracts without requiring a geologic investigation.

PREFACE

501.3.6.4.5 Size Requirements

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to remove references to these mixes. Also revise this subsection, adopted from the Concrete Masonry QMP Specification, to require the engineer's approval to use only size #1 coarse aggregate in Grade D concrete masonry.

Also revise paragraph four to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

501.3.6.5 Sampling and Testing

Revise this subsection to include the freeze/thaw soundness test method, AASHTO T 103 now required for targeted limestone/dolomite aggregates from specific geologic formations that have caused significant surface deterioration of concrete pavements and bridge decks.

501.3.8 Slag

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to remove references to these mixes. Also revise this subsection to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

501.4.3 Grades of Concrete

Revise this subsection to eliminate the date restriction on the use of fly ash and to eliminate Grade D-FA, D-S, D-IS, and D-IP concrete. The contractor can now use fly ash at any time of the year, but must protect the concrete from freezing until it meets the opening criteria. The contractor may now use Grades A-FA, A-S, A-IS, or A-IP for the corresponding D mixes.

Also revise this subsection to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

501.5.2 Proportions for Concrete

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise the "Proposed Master Limits of Job Mix" table in this subsection to remove references to these mixes. Also add footnote (9), adopted from the Concrete Masonry QMP Specification, to allow the use of non-chloride accelerators for all Grade A-FA, A-S, A-IP and A-IS concrete used in bridge substructures.

Also revise the "Proposed Master Limits of Job Mix" table in this subsection to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

501.5.5 (Vacant)

Delete this subsection. Fly ash properties are covered in 501.3.7 and required fly ash contents for various mixes are covered in 501.5.2.

PREFACE

501.5.6 (Vacant)

Delete this subsection. Slag properties are covered in 501.3.8 and required slag contents for various mixes are covered in 501.5.2.

501.7.4 Admixtures

Revise this subsection, adopted from the Concrete Masonry QMP Specification, to allow for the addition of air-entrained admixtures at the site of the work for concrete delivered in truck mixers.

501.8.2 Delivery

Revise this subsection to simplify the delivery requirements for all ready mixed concrete. The general 1 hour requirement is extended to 1 1/2 hours when the air temperature is less than 60 F (16 C), or the contractor uses an approved retarder.

501.8.3 Mixers and Mixing

Revise this subsection, adopted from the Concrete Masonry QMP Specification, to extend the mixing time to 300 total revolutions, revolutions at mixing speed plus revolutions at agitating speed, for truck mixers.

501.11 Placing

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Replace this subsection to remove references to these mixes.

501.12.3.1 General

Revise this subsection, adopted from the Concrete Masonry QMP Specification, to eliminate the date restriction on the use of fly ash and to tighten the temperature threshold for protection from 35 to 40 F (2 to 5 C). The contractor can now use fly ash at any time of the year, but must protect the concrete until it meets the opening criteria. Also revise this subsection to allow the contractor to use the maturity method to assess compressive strength for determining the duration of the required cold weather protection.

501.12.3.2 Mixing

Revise this subsection, adopted from the Concrete Masonry QMP Specification, to tighten the temperature threshold for protection from 35 to 40 F (2 to 5 C).

502.2.3 Liquid Membrane-Forming Compounds

Replace this subsection to correct the reference to 415.2.7.1.2. The correct reference is to 415.2.5.1.

502.3.2 Composition of Concrete

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to refer to 501.4.3.3 where the appropriate grades of concrete to use for elements of a structure are prescribed.

PREFACE

502.3.5.2 Falsework

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to remove references to these mixes. Also revise this subsection, adopted from the Concrete Masonry QMP Specification, to reduce the minimum times for removing falsework when field operations are not controlled by cylinder tests.

502.3.6.1 General

Revise paragraph ten and add paragraph ten-a, adopted from the Concrete Masonry QMP Specification, to add provisions to minimize air loss during pumping of concrete.

502.3.6.3 Depositing Concrete Underwater

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to remove references to these mixes. Also revise this subsection to clarify that the higher water content applies to concrete used in seals, and the 5 to 9 inch slump applies to all underwater concrete.

502.3.11.2 Superstructures

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Substitute Grade A-FA, A-S, A-IS, or A-IP mixes for Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to provide extended times when these mixes are used.

508.5.3 Timber Piling, Delivered

Revise this subsection to dual dimension pay factors for pointing timber pile cutoffs. This will implement 1999 Construction Note No. 8.

509.2 Materials

Eliminate Grade D-FA, D-S, D-IS, and D-IP concrete mixes. Revise this subsection to remove references to these mixes.

509.4.3 Joint Repair

Revise this subsection to eliminate the requirement for drilling holes through the deck during the removal operation. The new provision provides for a breakout arresting cut, or providing adequate coverage of steel exposed during joint repair.

510.5.1 Cast In Place Concrete Piling, Delivered and Driven

Revise this subsection to dual dimension pay factors for splicing cast-in-place piling. This will implement 1999 Construction Note No. 8.

511.5 Basis of Payment

Revise this subsection to dual dimension pay factors for splicing steel piling. This will implement 1999 Construction Note No. 8.

PREFACE

522.2.2 Reinforced Concrete Pipe

The current Federal Code of Regulations requires that both fly ash and slag be accepted as partial cement substitutes for work on all Federal aid projects. Currently we reference AASHTO M 170M for mix specifications for round concrete pipe, and that specification only recognizes fly ash as a mineral additive. Revise this subsection to recognize slag as a mineral additive, bringing us into compliance with Federal requirements.

523.2.2 Reinforced Concrete Horizontal Elliptical Pipe

The current Federal Code of Regulations requires that both fly ash and slag be accepted as partial cement substitutes for work on all Federal aid projects. Currently we reference AASHTO M 207M for mix specifications for elliptical concrete pipe, and that specification only recognizes fly ash as a mineral additive. Revise this subsection to recognize slag as a mineral additive, bringing us into compliance with Federal requirements.

601.2 Materials

Revise paragraph two to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

601.4.6 Protection and Curing

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing concrete curb and gutter, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10.

602.2 Materials

Revise paragraph two to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

602.3.1.6 Curing and Protection

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing concrete sidewalk, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10. The curing period is no longer defined; so this subsection has been revised to allow pedestrian traffic on sidewalks after the concrete has developed sufficient strength to prevent damage to the surface.

603.1 Description

Revise this subsection to clarify when to use the two Temporary Barrier Installed bid items. Also revise this subsection to improve uniformity in administering the two Temporary Barrier Delivered bid items by paying for delivery to each worksite within the project rather than paying for delivery just once to the project.

PREFACE

603.2 Materials

Revise paragraph two to incorporate a new slag concrete mix, Grade A-S2, for use in concrete masonry placed by a slip-form process. This mix is identical to the old A-S mix. The A-S mix has been modified to reduce the slag content to 30% for all non-slipformed concrete to address scaling and slow strength-gain concerns.

603.3.3.2 Contractor Furnished and Delivered

Revise this subsection to improve uniformity in administering this bid item by paying for delivery to each worksite within the project rather than paying for delivery just once to the project.

603.3.3.4 State Owned, Contractor Delivered

Revise this subsection to improve uniformity in administering this bid item by paying for delivery to each worksite within the project rather than paying for delivery just once to the project.

603.4 Method of Measurement

Revise this subsection to improve uniformity in how the Department measures the Temporary Barrier bid items.

603.5.2 Temporary Barrier

Revise this subsection to improve uniformity in how the Department pays for the Temporary Barrier bid items.

604.3.3.1 General

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing slope paving concrete, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10.

606.3.4 Grouted Riprap

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing grouted riprap, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10.

608.2 Materials

The current Federal Code of Regulations requires that both fly ash and slag be accepted as partial cement substitutes for work on all Federal aid projects. Currently we reference AASHTO M 170M for mix specifications for reinforced concrete pipe, and that specification only recognizes fly ash as a mineral additive. Revise this subsection to recognize slag as a mineral additive, bringing us into compliance with Federal requirements.

PREFACE

610.2 Materials

The current Federal Code of Regulations requires that both fly ash and slag be accepted as partial cement substitutes for work on all Federal aid projects. Currently we reference AASHTO M 170M for mix specifications for elliptical concrete pipe, and that specification only recognizes fly ash as a mineral additive. Revise this subsection to recognize slag as a mineral additive, bringing us into compliance with Federal requirements.

614.4 Method of Measurement

Revise this paragraph to indicate that the measurement limits for steel plate beam guard will be shown on the standard detail drawings. Beam guard terminals are measured as units not by the lineal foot. Discontinue the use of "Steel Plate Beam Guard, Slotted Rail Terminal".

620.3.2 Placing Concrete

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing concrete corrugated median, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10.

621.3.3 Curing and Protecting

Eliminate the wet fabric and paper curing methods for curing concrete pavement. For curing concrete monuments, the contractor now has the option of using the impervious coating, impervious sheeting, continuous wet cure, or alternate curing method as prescribed for concrete pavement in 415.5.10.

622.1 Description

Revise this subsection to require milled rumble strips on all asphaltic shoulders. See also Standard Detail Drawings S.D.D.13 A 5.

622.3 Equipment

Revise this subsection to require milled rumble strips on all asphaltic shoulders. See also Standard Detail Drawings S.D.D.13 A 5.

622.4.2 Asphaltic Shoulder Rumble Strip

Revise this subsection to require milled rumble strips on all asphaltic shoulders. See also Standard Detail Drawings S.D.D.13 A 5.

622.5.2 Asphaltic Shoulder Rumble Strip

Revise this subsection to require milled rumble strips on all asphaltic shoulders. See also Standard Detail Drawings S.D.D.13 A 5.

622.6.2 Asphaltic Shoulder Rumble Strip

Revise this subsection to require milled rumble strips on all asphaltic shoulders. See also Standard Detail Drawings S.D.D.13 A 5.

PREFACE

628.4.5 Silt Fence, Delivered

Revise this subsection to eliminate references to bid items for two kinds of silt fence, silty soil and sandy soil. These items were consolidated into one item in Interim #1 to the 1998 Supplemental Specifications.

628.4.6 Silt Fence, Installed

Revise this subsection to eliminate references to bid items for two kinds of silt fence, silty soil and sandy soil. These items were consolidated into one item in Interim #1 to the 1998 Supplemental Specifications.

628.5.5 Silt Fence, Delivered

Revise this subsection to eliminate references to bid items for two kinds of silt fence, silty soil and sandy soil. These items were consolidated into one item in Interim #1 to the 1998 Supplemental Specifications.

628.5.6 Silt Fence, Installed

Revise this subsection to eliminate references to bid items for two kinds of silt fence, silty soil and sandy soil. These items were consolidated into one item in Interim #1 to the 1998 Supplemental Specifications.

637.2.2.2 Type H Reflective Sheeting

Revise this paragraph to correct an error in the Type designation; should be Type III.

643.2.4 Drums

Revise this subsection to require traffic control drums to comply with the federal crashworthiness criteria of NCHRP Report 350. Also revise to clarify that acceptable performance is defined as a "good" evaluation rating in AASHTO tests.

643.2.6.1 Flexible Tubular Marker Posts

Revise paragraph two to require the tubular marker posts be selected from an approved products list and that the posts comply with the federal crashworthiness criteria of NCHRP Report 350. Revise paragraph three to clarify that acceptable performance is defined as a "good" evaluation rating in AASHTO tests.

643.2.12.1 General

Revise paragraph two of this subsection, originally added to the Standard Specifications in the 1996 Interim #1, to allow the use of fluorescent retroreflective roll-up signs for signs mounted on portable sign supports.

643.2.12.2 Orange Work Zone Traffic Control Signs

Revise this subsection, originally added to the Standard Specifications in the 1996 Interim #1, to allow the use of fluorescent retroreflective roll-up signs for signs mounted on portable sign supports, and to require that the portable sign supports used with roll-up signs comply with the federal crashworthiness criteria of NCHRP Report 350. Also revise to eliminate the substitution of signs with non-fluorescent orange prismatic sheeting.

PREFACE

651.3 Construction Methods

Revise paragraph eight to eliminate a grammar mistake.

658.3.4 Backplates

Revise this subsection to clarify that backplates must be furnished and installed for all signal faces. Retire the backplate bid items: 65835 - 65839. See also Bid Items Retired and SDD's 9 E 1-2a, b, & c.

658.4 Method of Measurement

Revise this subsection to indicate that backplates will no longer be measured separately but included with signal faces. Retire the backplate bid items: 65835 - 65839. See also Bid Items Retired and SDD's 9 E 1-2a, b, & c.

658.5 Basis of Payment

Revise this subsection to indicate that backplates will no longer be paid for separately but will be included in the signal face item. Retire the backplate bid items: 65835 - 65839. See also Bid Items Retired and SDD's 9 E 1-2a, b, & c.

BID ITEMS RETIRED - U.S. STANDARD MEASURE (EAS VERSION 3)

Retire these bid items effective with the Supplemental Specifications - 1999 Edition:

65835	Backplates, 1 Section, 12-Inch Signal Faces
65836	Backplates, 3 Section, 12-Inch Signal Faces
65837	Backplates, 4 Section, 12-Inch Signal Faces
65838	Backplates, 5 Section, 12-Inch Signal Faces
65839	Backplates, 12-8-8 Inch Signal Faces

BID ITEMS RETIRED - SI METRIC (EAS VERSION 4)

Retire these bid items effective with the Supplemental Specifications - 1999 Edition:

65835	Backplates, 1 Section, 300 mm Signal Faces
65836	Backplates, 3 Section, 300 mm Signal Faces
65837	Backplates, 4 Section, 300 mm Signal Faces
65838	Backplates, 5 Section, 300 mm Signal Faces
65839	Backplates, 300-200-200 mm Signal Faces

ERRATA SHEET

Update the errata sheet of Interim #1 to the Supplemental Specifications - 1998 Edition. The other errors shown in the errata sheet of Interim #1 to the Supplemental Specifications - 1998 Edition have been incorporated as regular supplemental specifications in this edition.

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PART I GENERAL REQUIREMENTS AND COVENANTS

SECTION 101 DEFINITIONS AND TERMS

Add the following definition:

Consulting Firm The individual, partnership, joint ventures, corporation or agency contracted by the Department to act directly or as a duly authorized construction representative providing services for the Department.

Replace the following three definitions:

Bidder Any individual, partnership, joint venture, corporation, limited liability company, limited liability partnership, or a combination of any or all jointly, submitting a proposal (bid) for the work advertised in the invitation for bids, acting directly or through a duly authorized representative.

Contractor The individual, partnership, joint venturers, corporation, limited liability company, limited liability partnership or agency undertaking the performance of the work under the terms of the contract and acting directly or through a duly authorized representative.

Working Day A calendar day, except Saturdays, Sundays, specified legal holidays, and the period from November 16 to March 31, both dates inclusive, on which weather or other conditions not under the control of the contractor will permit construction operations to proceed for at least eight hours of the day with the normal working force engaged in performing the controlling item of work which would be in progress at this time.

102.5 Preparation of Proposal

Replace paragraph one with the following:

- (1) The bidder shall submit the proposal on the form furnished or in the format approved by the Department. In lieu of using the Department's Schedule of Prices, the bidder may submit a computer generated substitute schedule with the proposal. The substitute schedule shall be in a format conforming to the Department's guidelines for approval of computer generated Schedule of Prices and must be approved in writing by the Department prior to use, or the substitute schedule shall be in a format generated through use of Department supplied computer software. The proposal shall be executed properly, and shall clearly specify a unit price in dollars and cents, in numerals, for each item listed therein and shall also show, in numerals, in the column provided for that purpose, the products of the respective unit prices and quantities, and the total amount of the bid obtained by adding the extended amounts of the several items. A lump sum item should be shown as the same price in dollars and cents in the unit price column and in the extended amount column pertaining to that item. If one column is left blank for a lump sum item, the single amount shown will be used to obtain the total amount of the bid.

Replace paragraph six with the following:

- (6) A proposal submitted by an individual shall be signed by the bidder or by a duly authorized agent. A proposal submitted by a partnership or a limited liability partnership shall be signed by a member or by a duly authorized agent thereof. A proposal submitted by a joint venture shall be signed by a member or by a duly authorized agent of at least one of the firms. A proposal submitted by a corporation shall be signed by an authorized officer or duly authorized agent of such corporation, and the proposal shall show the name of the State under the laws of which such corporation was chartered. A proposal submitted by a limited liability company shall be signed by a duly authorized agent of the company. The required signatures shall in all cases appear in the space provided therefor on the proposal. All addenda to the contract shall be attached to the submitted proposal by the bidder.

102.6 Irregular Proposals

Replace paragraph four with the following:

- (4) If on a computer generated Schedule of Prices the item number is correct and the description is incorrect, then the description will be corrected to reflect the Department's form and line number sequencing.

102.7 Proposal Guaranty

Replace the entire text with the following:

- (1) No proposal will be considered unless accompanied by properly executed bid bond, of not less than five percent of the total bid, on the Department's form contained in the proposal, or cashier's check, certified check, bank's check or postal money order in the amount designated on the proposal and payable to the Department. Certified checks shall be drawn on the account of the bidder submitting the proposal.
- (2) The bidder may also meet the above requirements by having a properly executed annual bid bond of not less than five percent of the total bid(s) on file with the Department. The annual bid bond shall be on the form provided by the Department.
- (3) The surety issuing the bid bond must have an equivalent A.M. Best rating of A- or better and be licensed to do business in the State of Wisconsin.
- (4) If alternate bids are invited and submitted, the bidder may submit one proposal guaranty in the total amount required for the combined alternate which will also be considered as covering each individual proposal.

102.11 Competency of Bidders

Replace paragraph two with the following:

- (2) Any individual, partnership, corporation, joint venture, limited liability company or limited liability partnership desiring to bid on any work under the jurisdiction or management of the Department shall furnish the Department a statement on a form provided by the Department, which statement shall fully develop the financial ability, adequacy of plant, equipment and organization, prior experience and other pertinent and material facts required; certificates for insurance Types 1, 2 and 3 as required by 107.26 shall be included.

102.12 Disqualification of Bidders

Replace item three with the following:

3. More than one proposal for the same work from an individual, partnership, joint venture, corporation, limited liability company or limited liability partnership under the same or different names.

103.1 Consideration of Proposals

Replace paragraph five with the following:

- (5) Proposals will be considered irregular and will be rejected as nonresponsive if any of the unit bid prices are significantly unbalanced to the potential detriment of the Department.

104.6.1 General

Add the following at the end as paragraph ten:

- (10) Flagging and guidance of traffic shall be done according to the latest revision of Part VI, Traffic Controls for Construction and Maintenance Operations of the Wisconsin Manual on Uniform Traffic Control Devices, the provisions of Section 643, the contract, and as directed by the engineer. Flagging and guidance services, and signs associated with flagging and guidance, will be considered incidental to the items of work in the contract.

105.3 Conformity with Plans and Specifications

Replace paragraph eight with the following two paragraphs:

- (8) If the engineer determines that noncomplying work or materials may remain in place, the contract change order for the unit price adjustment will include a \$400.00 lump sum credit to the Department for administrative costs, which credit shall cover all items contained in the contract change order.
- (9) If a portion of the work cannot be constructed in accordance with the SI Metric system dimensions and values shown in the plans, specifications or contract provisions, the contractor may construct that portion of the work to essentially equivalent U.S. Standard Measure system dimensions and values, provided written approval of the engineer has been obtained before construction of the work under consideration is started.

106.1 Source of Supply and Quality

Delete paragraphs eight, nine, and ten.

Add the following to the end as paragraphs thirteen and fourteen:

- (13) The contractor may substitute a product manufactured or fabricated to the U.S. Standard Measure system of measurement for a product manufactured or fabricated to the SI Metric system of measurement, provided the following requirements are met:
 - 1. The substitute product shall be manufactured or fabricated from the same material as the original product, and shall comply with the U.S. Standard Measure system version of the specification requirement for the original product.
 - 2. Dimensions of the substitute product shall be essentially equal to dimensions of the original product. Established manufacturing and fabrication tolerances will be permitted except where absolute maximum or minimum dimensions are specified in the contract.
- (14) The contractor shall certify to the engineer in writing that the substitute product complies with the above requirements. The contractor shall not furnish the substitute product until the engineer has approved the product substitution in writing. There shall be no credit to the Department or additional payment to the contractor for such substitution.

107.12 Responsibility for Damage and Tort Claims

Replace paragraph one with the following:

- (1) The contractor and the contractor's insurer shall defend, indemnify and save harmless the State, its officers, agents (in this context, agents exclude consulting firms, Wisconsin Counties and Municipalities and their respective officers and employees) and employees, from all suits, actions or claims of any character brought because of any injuries or damages received or sustained by any person, persons or property on account of the operations of the contractor; or on account of or in consequence of any neglect in safeguarding the work, or through use of unacceptable materials in constructing the work; or because of any act or omission, neglect or misconduct of the contractor; or because of any claims or amounts recovered for any infringement by the contractor of patent, trademark or copyright; or from any claims or amounts arising or recovered under the Worker's Compensation Act, relating to the contractor's employees; or any other law, ordinance, order or decree relating to the contractor's operations. So much of the money due the contractor under and by virtue of the contract as shall be considered necessary by the Department for such purposes, may be retained for the use of the State until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Department. The contractor shall also comply with all of the above requirements defending, indemnifying and saving harmless the county, town or municipality in which the improvement is made and each of them separately or jointly and their officers, agents and employees.

Delete paragraph three.

107.17.3 Railroad Insurance Requirements

Replace the entire text with the following:

- (1) When required in the special provisions, the contractor shall provide or arrange for a subcontractor to provide, railroad protective liability insurance in addition to the types and limits of insurance required in 107.26. The railroad protective liability insurance shall remain in force until all work under or incidental to the contract, on the railroad right of way or premises of the railroad, has been completed by the contractor and accepted by the Department.
- (2) The railroad protective liability coverage shall be written according to the requirements of Federal regulation 23 CFR Part 646 Subpart A. The policy shall name, as insured parties:
 1. The railroad which owns the affected right of way and premises.
 2. Other railroads operating on the track by agreement with the owner.
- (3) The contractor's or subcontractor's railroad protective liability policy shall provide the following minimum limits of coverage:
 1. Coverage A, Bodily Injury Liability and Property Damage Liability; \$2 million per occurrence.
 2. Coverage B, Physical Damage to Property Liability; \$2 million per occurrence.
 3. An annual aggregate amount of \$6 million that shall apply separately to each policy renewal or extension.
- (4) The contractor or subcontractor shall furnish evidence of the required coverage by submitting one copy of the policy to the railroad and a second copy, including a copy of the letter of transmittal to the railroad, to the Department prior to commencing work under the contract. The contractor shall not enter onto the right of way or premises of the railroad for the purpose of doing work under the contract until the policy has been received by the Department.
- (5) The Department requires a 60 day notice of cancellation or material change in coverage. All coverage shall be placed with the insurance companies licensed to do business in the State of Wisconsin that have an A. M. Best rating of A- or better. The Department reserves the right to require other coverages and limits as may be detailed in the special provisions. The Department considers the cost of providing the required insurance coverage incidental to the contract and will make no additional compensation for that coverage.

107.22 Contractor's Responsibility for Utility Property and Services

Replace paragraph four with the following two paragraphs:

- (4) If utility facilities or appurtenances not identified in the contract are found, the engineer will determine whether adjustment or relocation of the utility is necessary to accommodate contract work. Arrangements will be made by the engineer with the utility or the contractor for adjustment or relocation deemed necessary by the engineer. Such work done by the contractor will be compensated as provided in 104.5.
- (5) When specified in the contract, the requirements of Administrative Rule, TRANS 220 will apply.

107.25 Archeological and Historical Findings

Replace the entire text with the following:

- (1) Whenever the construction operations encounter human remains, or artifacts believed to be of archeological or historical significance, the contractor shall immediately cease operations at the encounter site and the contractor shall notify the responsible State agency or agencies, as the case may be. The contractor shall comply with directions of the responsible State agency or agencies, and shall cooperate in any necessary moving of construction operations from the site. Work may be continued elsewhere on the project unless otherwise directed by the engineer. Operations at the encounter site shall not resume until allowed by the responsible State agency or agencies.

Add the following new subsection:

107.26 Standard Insurance Requirements

- (1) The contractor shall maintain the following types and limits of commercial insurance in force until such time as all work under or incidental to the contract has been completed by the contractor and accepted by the Department:

<u>Type of Insurance</u>	<u>Minimum Limits Required*</u>
1. Commercial General Liability Insurance; shall be endorsed to include blanket contractual liability coverage.	\$2 Million Combined Single Limits per Occurrence; may be subject to an Annual Aggregate Limit of not less than \$4 Million.
2. Workers' Compensation and Employers' Liability Insurance.	Workers' Compensation: Statutory Limits Employers' Liability: Bodily Injury by Accident: \$100,000 Each Accident Bodily Injury by Disease: \$500,000 Each Accident \$100,000 Each Employee
3. Commercial Automobile Liability Insurance; shall cover all contractor-owned, non-owned, and hired vehicles used in carrying out the contract.	\$1 Million-Combined Single Limits Per Occurrence.

*These requirements may be satisfied either through primary insurance coverage or through excess/umbrella policies.

- (2) Each bidder shall provide the Department with Certificates of Insurance as evidence that required coverages for Insurance Types 1, 2 and 3 are in force. The certificates shall be provided at the time of prequalification in accordance with requirements of 102.11.
- (3) A 60 day notice of cancellation or material change in coverage will be required. All coverage shall be placed with insurance companies licensed to do business in the State of Wisconsin that have an A.M. Best rating of A- or better. The Department reserves the right to require other coverage and limits as detailed in the special provisions. The cost of providing the required insurance coverage and limits shall be considered incidental to the contract and no additional or special compensation will be made therefor.
- (4) The above insurance requirements shall apply with equal force whether the work under the project is performed by the contractor, by a subcontractor or by anyone directly or indirectly employed by either of them.

108.7 Determination and Extension of Contract Time for Completion

Replace paragraph one with the following:

- (1) The time for completion of the work contemplated under the contract will be specified in the proposal as a specific number of calendar days including Saturdays, Sundays and holidays, subject to the provisions of Subsection 108.13.1; as a specific number of working days, excluding Sundays, Saturdays, New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Eve Day, Christmas Day, New Year's Eve Day and the period from November 16 through March 31, both dates inclusive, subject to the provisions of Subsection 108.12.2; or as a given calendar date on or before which the work shall be completed. The completion of work within the time as specified is an essential part of the contract.

108.8 Liquidated Damages

Replace the table with the following:

Original Contract Amount		Daily Charge	
From More Than	To and Including	Calendar Day	Working Day
\$0	\$100,000	\$205	\$410
\$100,000	\$300,000	\$295	\$590
\$300,000	\$500,000	\$515	\$1030
\$500,000	\$1,000,000	\$765	\$1530
\$1,000,000	—	\$1205	\$2410

108.12.2.1 General

Replace paragraph two with the following:

- (2) No working day charges will be assessed on Saturdays, Sundays, New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Eve Day, Christmas Day, and New Year's Eve Day, nor during the period from November 16 through March 31, both dates inclusive, even though work is performed on the controlling item, or on other days or times specified in the special provisions when work on the controlling item is prohibited, except that working day time charges will be assessed after November 15 for those contracts not completed to the stage required by the contract to be completed by November 16.
-

109.1.1 General

Replace the entire text with the following:

- (1) All work completed under contracts with the plans and schedule of prices developed under the U.S. Standard Measure system, will be measured by the engineer according to the U.S. Standard Measure system. All work completed under contracts with the plans and schedule of prices developed under the International System of Units (SI), will be measured by the engineer according to the International System of Units (SI). The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to standard engineering practice, as modified to meet Departmental requirements. Measurements and methods will be documented in accordance with procedures prescribed by the Department.
- (2) The completed work will be measured for final payment by the engineer, as specified for the various items elsewhere in the standard specifications, to determine the quantities of such items of work performed, and the contractor will be paid for the actual amount of work performed in accordance with the contract, as shown by the final measurements, with the following exceptions:
 1. An agreement has been made to compensate the contractor on the basis of plan quantity.

If the contractor and the engineer agree in writing the quantities of certain items or portions of items of work as set forth in the contract or on the plans, as originally drawn or subsequently corrected or revised, are in substantial agreement with actual quantities of work performed, compensation will be made based on the quantities set forth in the contract or on the plans, as originally drawn or subsequently corrected or revised, without measurement, and the contractor shall accept such compensation as full payment for such items, or portions of items, in accordance with the provisions of 109.2.
 2. Contract change orders have been executed providing for methods of measurement other than provided elsewhere in the standard specifications for the various items.

The quantities of work measured for final payment will be determined by using the methods of measurement applicable to the various items as a result of the contract change orders.

3. Plan dimension modifications have been requested by the contractor to accommodate a change from the SI Metric System to the U.S. Standard Measure System and have been approved by the engineer.

The quantities to be measured for final payment will be the quantities of the various items actually constructed under the modified plan dimensions, or the quantities of the various items derived from the original plan dimensions, whichever is less.

4. Substitution of an item manufactured to the U.S. Standard Measure System for an item manufactured to the SI Metric System has been done in accordance with requirements of 106.1.

The quantity measured for final payment will be the quantity actually furnished and constructed.

109.2 Scope of Payment

Add the following to the end as paragraph four:

- (4) For contracts with the plans and schedule of prices developed under the U.S. Standard Measure system, payment will be made under the U.S. Standard system units in the contract Schedule of Prices. For contracts with the plans and schedule of prices developed under the metric International System of Units (SI), payment will be made under the metric International System of Units (SI) units in the contract Schedule of Prices.

PART II EARTHWORK

201.2 Construction Methods

Replace paragraph two with the following:

- (2) Unless specifically designated otherwise on the plans or by the engineer; the contractor shall cut off and dispose of all trees, brush, shrubs, or other vegetation occurring within the clearing limits. Within the grubbing limits; the contractor shall remove debris not suitable for the roadway foundation, stumps and associated roots, logs, timber, brush, and matted roots to the following minimum depths:
 1. In cut areas, one foot (300 mm) below final subgrade.
 2. In embankment areas, one foot (300 mm) below the existing grade.
-

201.3.1 Forty Meter Unit

Replace the entire text with the following:

- (1) When so provided, the quantity of clearing or of grubbing will be measured by the full 40 m survey unit along the roadway centerline or reference line. When two or more roadways occur, the quantity of clearing or of grubbing will be measured by the full 40 m survey unit along the centerline or reference line of each roadway. For divided highways, units for each roadway will extend, in width, from 1.5 m outside the grading limit of that roadway to a line mid-way between the reference lines or centerlines for each roadway.
 - (2) Only 40 m survey units within which it is necessary to remove at least four trees or stumps 75 mm or over in diameter, or any tree or stump or combination of trees or stumps 75 mm or over in diameter whose diameter or total diameters equal or exceed 300 mm will be included for payment. Measurements for diameter will be made as specified in 201.3.2.
 - (3) All units included for payment will be paid for as full units.
-

204.2.2 Abandoning Pipes and Structures

Revise sentence one of paragraph twelve as follows:

- (12) Chips in the 6 mm to 10 mm range shall be used for sealing wells of 100 mm diameter, and chips in the 10 mm to 20 mm range shall be used for sealing wells larger than 100 mm diameter.
-

205.3.1 Preparing Roadway Foundation

Replace paragraphs one and two with the following:

- (1) Vegetation of a height greater than 300 mm shall be cut and properly disposed of before ground is broken for excavation or before embankment is placed thereon. Heavy sod, perishable material, unstable topsoil, and other undesirable foundation material underlying proposed roadway embankments within the limits of the assumed one to one slopes extending outward from the outer limits of the finished shoulders shall be removed. Muck, peat and other unstable material shall be removed, disposed of, or otherwise treated as shown on the plans.
- (2) All suitable topsoil material within the areas of excavation and within the limits described above for embankment areas, necessary and suitable to cover the slopes for the items of Salvaged Topsoil or Topsoil, shall be removed as Salvaged Topsoil as prescribed in 625.3.2 "Processing Topsoil or Salvaged Topsoil". Unstable topsoil lying within the limits described above for embankment areas, in excess of amounts necessary to cover the slopes for the items Salvaged Topsoil or Topsoil, shall be removed as prescribed in 205.3.3 and paid for as Excavation Below Subgrade.

206.3.12 Backfill

Replace the entire text with the following:

206.3.12.1 Materials

- (1) Material used for backfill shall be of a quality acceptable to the engineer and shall be free from frozen lumps, wood or other extraneous or perishable material. Approved material from excavation may be used for backfilling unless Structure Backfill is specified. When Structure Backfill is specified, material from excavation meeting the requirements for Structure Backfill may be used for backfilling in accordance with the provisions of 104.8. Stone used in backfilling shall be enveloped entirely by finer material.

206.3.12.2 Construction Methods**206.3.12.2.1 General**

- (1) All spaces excavated and not occupied by the new structure shall be backfilled to the elevation and section existing prior to excavation, except backfill shall not be placed above the required section for the finished work. Backfill shall be sufficient to provide allowance for settlement.
- (2) Except as required for the safety of workers, substructure units shall not be backfilled until the area involved shall have been cleared of all falsework, sheet piling, cribbing, shoring, bracing, forms, and rubbish. Cofferdams shall be backfilled prior to removal of sheeting, unless otherwise permitted by the engineer.
- (3) When required for the safety of workers and with the approval of the engineer, sheet piling, cribbing, shoring, and bracing may be removed as backfilling progresses.
- (4) Backfilling shall be so performed as to prevent wedging action against the structure. Existing slopes shall be stepped, terraced or otherwise treated as necessary to prevent slippage and wedging of the backfill.
- (5) Unless otherwise provided, backfill shall be placed in continuous horizontal layers not more than 8 inches (200 mm) thick that are brought up uniformly, as far as practicable, on all sides of each substructure unit or culvert. Each layer shall be adequately compacted, before the next layer is placed, by means of approved rollers or portable mechanical or pneumatic tampers or vibrators.
- (6) If there is water in an excavation, backfilling operations in the excavation shall be so performed that such water will be displaced by the backfill and not trapped therein. Water shall not be used to expedite settlement of backfill except with the written approval of the engineer, but this provision shall not require an excavation to be dewatered before placing backfill. When the use of water is permitted, the entire excavation shall be kept inundated during the period that backfill is placed, except when jetting is allowed.
- (7) Backfilling operations shall be conducted in such a manner that no portion of the structure is damaged or deflected out of alignment. Backfilling material transported in trucks or other vehicles shall be dumped so that the contents of each vehicle are gradually deposited instead of dumping the entire contents as one mass. Insofar as practicable, all clams, dippers and similar containers of backfill shall be lowered to within 5 feet (1.5 m) of the surface of the previously deposited backfill, or of the water surface, before they are dumped.
- (8) Backfill may be end dumped from the structure or approach embankment if the material is spread and placed in the above-described 8 inches (200 mm) horizontal layers after it is end dumped. Backfill shall not be placed in or from narrow ramps or driveways up to or from the structure.
- (9) Backfilling of structural plate pipe and pipe arches shall be accomplished as provided in 527.4.2.
- (10) Backfill along the front face of abutments, retaining walls, and wing walls shall extend to within 6 inches (150 mm) of the weep holes, unless otherwise designated.
- (11) When weep holes are designated on the plans for culverts, abutments, and retaining walls there shall be placed behind the culvert, abutment or retaining wall at the level of the weep holes a

deposit or deposits of coarse gravel or broken stone. The dimensions of those deposits shall conform to the dimensions indicated on the plans.

- (12) Backfill shall not be placed against any portion of any substructure unit until the required curing, surface preparation, dampproofing, and waterproofing of the work to be covered by backfill has been completed.

206.3.12.2.2 Self-Supported Abutments and Retaining Walls

206.3.12.2.2.1 General

- (1) Self supported structures must develop sufficient strength before they can be backfilled.

206.3.12.2.2.2 Backfill on One Side of the Structure

- (1) The Contractor may backfill structures that have attained the specified compressive strength or upon expiration of the minimum time periods tabulated below:

Structure Type*	Minimum Time (days)**		Compressive Strength
	General Purpose Concrete	High Early Strength Concrete	
Abutment Type A1, A2, A5	2	1	2000 psi (13.8 MPa)
Abutment Type A3***	2	1	2000 psi (13.8 MPa)
Abutment Type A4	14	7	3000 psi (20.7 MPa)
Full Retaining Abutments	14	7	3000 psi (20.7 MPa)
Concrete Masonry Retaining Walls	14	7	3000 psi (20.7 MPa)

*Abutment Types:

- A1: Body about 5 feet (1.5 m) tall with 1 row of piles.
- A2: Body about 5 feet (1.5 m) tall with 2 rows of piles.
- A3: Body about 5 feet (1.5 m) tall with backwall and 2 rows of piles
- A4: Body about 13 feet (4 m) tall with backwall and 2 or more rows of piles.
- A5: Body about 10 feet (3 m) tall with 1 row of piles extending to within 2 feet (0.6 m) of abutment top.

Full Retaining: Body extending from lower roadway/river elevation to beam seats.

**Only count days where the concrete temperature did not fall below 40 F (4 C).

***Upon obtaining the required compressive strength, the contractor may backfill the body of A3 abutments before the backwall is placed.

206.3.12.2.2.3 Backfill on Both Sides of the Structure

- (1) Footings may be backfilled to the top of the footings, sill abutments may be backfilled to the berm elevation, and retaining walls and piers may be backfilled uniformly and simultaneously on both sides to the elevation of the front ground surface immediately upon removal of the forms.

206.3.12.2.3 Rigid Frame Structures

- (1) Backfill shall not be placed against any abutment or wall which is designed to gain support from a superstructure until the superstructure has been poured and cured.
- (2) One quarter of total wall height of box culverts may be backfilled after the wall compressive strength has reached 2000 psi (13.8 Mpa). Box Culverts may be backfilled entirely after concrete in the top of the box has been poured and cured.

206.3.13 Disposal of Excavated Material

Replace paragraph one with the following:

- (1) Excavated material suitable for use as riprap may be so placed if such use is appropriate. Excavated material not used as riprap and suitable for backfilling may be so utilized. Excavated material not used for riprap or backfilling and suitable for the construction of embankments shall be used therefor in accordance with the requirements for Roadway and Drainage Excavation and Embankments, provided the contract contains a bid item of Common Excavation, Unclassified Excavation or Borrow Excavation, and there is a need for such excavated material in the embankment at the time of disposal. Payment for the excavated material used in the embankment construction will be at the contract unit price for Borrow Excavation. In the absence of a Borrow Excavation item in the original contract, payment will be made at the contract unit price for Common Excavation or Unclassified Excavation, as the case may be. The quantity of excavated material used in the embankment construction shall be determined in accordance with 205.5.1. Overhaul will not be allowed for excavated material placed in embankments.

PART III BASE COURSES

304.1 Description

Replace paragraphs one and two with the following:

- (1) Crushed Aggregate Base Course shall consist of a dense graded compacted base course composed of one or more courses or layers of coarse aggregate, either crushed gravel or crushed concrete or crushed stone or crushed asphaltic pavement; fine aggregate; and binder or filler. Aggregate produced from crushed gravel, crushed concrete, or crushed stone may be supplemented with crushed aggregate produced from industrial by-products or recycled/reclaimed materials as described in Subsection 304.2.1. All materials shall be blended as necessary to produce an intimate mixture of the required gradation and stability, constructed on the prepared foundation in accordance with the specifications and in reasonably close conformity with the lines, grades, thicknesses and typical cross-sections shown on the plans or established by the engineer.
- (2) Crushed Aggregate Base Course, Open Graded, shall consist of an open graded, compacted base course composed of one or more courses or layers of coarse aggregate, either crushed gravel or crushed concrete or crushed stone, and fine aggregate. Aggregate produced from crushed gravel, crushed concrete, or crushed stone may be supplemented with crushed aggregate produced from industrial by-products or recycled/reclaimed materials as described in Subsection 304.2.1. All materials shall be blended as necessary to produce an intimate mixture of the required gradation and stability, constructed on the prepared foundation in accordance with the specifications and in reasonably close conformity with the lines, grades, thicknesses and typical cross-sections shown on the plans or established by the engineer.

Delete paragraph seven.

Replace paragraph eight with the following:

- (8) Salvaged Asphaltic Pavement, Base Course, shall consist of the necessary processing of the stockpile, loading, hauling and placing salvaged asphaltic pavement as base course, at the locations shown on the plans or as directed by the engineer, in accordance with the specifications.

304.2.1 General Conditions

Add the following to the end as paragraph five:

- (5) Limited amounts of aggregate produced from an allowed industrial by-product or an allowed recycled/reclaimed material may be blended with crushed gravel, crushed concrete, or crushed stone. Specific materials and allowable percentages, by weight, are listed in Subsection 304.2.3. These materials shall be substantially free of deleterious substances and shall be crushed, screened, and blended with the crushed gravel, crushed concrete, or crushed stone to produce a uniform mixture. This blended material shall contain only one industrial by-product or one recycled/reclaimed material. This blended material shall not be used in the upper 3 inches (75mm) of Crushed Aggregate Base Course used as an aggregate shoulder or in the upper 3 inches (75mm) of a temporary or permanent aggregate roadway.

304.2.3 General Requirements

Replace the entire text with the following:

- (1) The aggregates for Crushed Aggregate Base Course shall consist of hard, durable particles of crushed stone or crushed concrete or crushed gravel and a filler of natural sand, stone sand or other finely divided mineral matter. The aggregates for Crushed Aggregate Base Course, Open Graded, shall consist of hard, durable particles of crushed stone or crushed gravel or crushed concrete. Except for applications excluded in Subsection 304.2.1, Crushed Aggregate Base Course and Crushed Aggregate Base Course, Open Graded may contain up to the listed maximum

percentage, by weight, of one of the following permitted industrial by-products or recycled/reclaimed materials:

<u>Material</u>	<u>Maximum Percentage (by weight)</u>
Glass	12
Foundry slag	7
Steel mill slag	15
Bottom ash	8
Pottery cull	7

- (2) Oversize material encountered in deposits from which the material is taken shall be removed by screening or shall be crushed to the required sizes. The composite material shall be substantially free from vegetable matter, shale and lumps or balls of clay, and shall conform to the pertinent gradation requirements.
- (3) Unless otherwise specified in the contract, the aggregate, including any industrial by-product or recycled/reclaimed material, shall have a percentage of wear of not more than 50, as determined by AASHTO T 96.
- (4) The aggregate, including any blended filler and any industrial by-product or recycled/reclaimed material, shall have a liquid limit of not more than 25 and a plasticity index of not more than six, except in the case of aggregates for base courses placed between old and new pavements, where the plasticity index shall not exceed three.
- (5) For aggregate for crushed aggregate base course, a minimum of 45 percent, by count, of the number of particles of aggregate retained on the No. 4 (4.75 mm) sieve shall have at least one fractured face.
- (6) For aggregate for open graded base course, a minimum of 90 percent, by count, of the number of particles retained on the No. 4 (4.75 mm) sieve shall have at least one fractured face.

304.2.3.1 (Vacant)

304.2.3.2 Salvaged Asphaltic Pavement, Base Course

- (1) Stockpiled salvaged asphaltic pavement material to be used as Base Course, Gradation No. 1, (Subsection 304.2.6) shall be processed as necessary so 100 percent will pass a 37.5 mm sieve.
- (2) Stockpiled salvaged asphaltic pavement material to be used as Base Course, Gradation No. 2 or No. 3, (Subsection 304.2.6) shall be processed as necessary so 100 percent will pass a 25.0 mm sieve.
- (3) Other requirements of 304.2 shall not apply.

304.2.4 Soundness

Replace the entire text with the following:

- (1) When the fraction of the aggregates, including any industrial by-product or recycled/reclaimed material, retained on the No. 4 (4.75 mm) sieve is subjected to five cycles of the sodium sulfate soundness test (AASHTO T 104), the weighted loss shall not exceed 18 percent by mass for crushed aggregate base course, or 12 percent for crushed aggregate base course, open graded, unless otherwise provided in the contract. If the quality of material or conditions of deposition in a quarry or deposit make questionable the continuous compliance with this soundness requirement, the engineer reserves the right to require maintenance of a stockpile or stockpiles of produced material sufficiently large to preclude use of material which has not been previously approved by test.

304.2.6 Gradation Requirements

Replace paragraph three with the following:

- (3) Unless otherwise specified in the special provisions; the contractor shall use Gradation No. 3 in the top 3 inches (75 mm) of unpaved or unstabilized shoulders adjacent to live traffic lanes or paved shoulders, and use either Gradation No. 2 or No. 3 in the balance of the shoulder.

304.2.7 Sampling and Testing

Replace paragraph one with the following:

- (1) Sampling and testing will be as prescribed in the following AASHTO methods, except as revised with the engineer's approval:

Sampling aggregates	T 2
Material finer than No. 200 (75 µm) sieve	T 11
Sieve analysis of aggregates	T 27
Sieve analysis of mineral filler.....	T 37
Liquid limit of soils.....	T 89
Plastic limit of soils.....	T 90
Plasticity index of soils	T 90
Los Angeles abrasion of coarse aggregate	T 96
Specific gravity and absorption of fine aggregate	T 84
Specific gravity and absorption of coarse aggregate	T 85*
Sodium sulfate soundness of aggregates.....	T 104

*As revised by the Department's Method T 85-1

304.9.1 General

Replace paragraph one with the following:

- (1) The items of Crushed Aggregate Base Course; Crushed Aggregate Base Course, Detours; Salvaged Crushed Aggregate Base Course; Producing and Stockpiling Crushed Aggregate Base Course; Hauling and Placing Crushed Aggregate Base Course; Crushed Aggregate Base Course, Open Graded Number (-); and Salvaged Asphaltic Pavement, Base Course will each be measured as provided in the contract by the megagram, or in the vehicle by the cubic meter. The quantity to be measured for payment shall be the amount of material required and incorporated in the work or placed in stockpiles in accordance with the contract.

Replace paragraph six with the following:

- (6) The Department will measure Shaping Shoulders in partial 100 foot survey stations (meters) along each side of the traveled way.

304.10 Basis of Payment

Replace paragraph two with the following:

- (2) The quantity of aggregate for the item of Crushed Aggregate Base Course, Open Graded Number (-), measured as provided above, will be paid for at the contract unit price per ton (Mg) or cubic yard (m³), which price shall be full compensation for furnishing, producing, crushing, screening, loading, hauling, placing, watering unless otherwise provided, drying and compacting; for maintaining; for preparing foundation, unless otherwise provided; for dust abatement, unless otherwise provided; for stockpiling, if required; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

Delete paragraph six.

Replace paragraph seven with the following:

- (7) The quantity of aggregate for the item of Salvaged Asphaltic Pavement, Base Course, measured as provided above, will be paid for at the contract unit price per megagram or per cubic meter, which price shall be full compensation for the necessary processing of the stockpile, loading, hauling, placing and compacting; for maintaining; for preparing foundation; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

306.7.1 Asphaltic Base Course

Replace paragraph one with the following:

- (1) The quantity of Asphaltic Base Course, measured as provided above, will be paid for at the contract unit price per megagram. This price shall be full compensation for furnishing all materials, except asphaltic materials; for preparing, mixing, hauling, placing and compacting; for preparing foundation, unless otherwise provided; and for all labor, tools, equipment and incidentals, including maintenance until acceptance, necessary to complete the work.

306.7.2 Asphaltic Base Course Widening

Replace paragraph one with the following:

- (1) The quantity of Asphaltic Base Course Widening, measured as provided above, will be paid for at the contract unit price per megagram, which price shall be full compensation for all excavation, reconstructing earth shoulders, satisfactory disposal of surplus or unsuitable excavated material; for the preparation and compaction of the foundation; for furnishing, preparing, handling, placing and consolidating the asphaltic mixture; for furnishing all materials, except asphaltic materials; and for all labor, tools, equipment and incidentals necessary to satisfactorily complete the work.

307.3.1.3 Curing of Concrete

Replace the subsection heading and the entire text with the following:

307.3.1.3 Opening Concrete Base Course to Traffic

- (1) The procedures and opening criteria for Concrete Base Course shall be the same as specified in 415.5.15 for Grade A concrete used in concrete pavement; except when the contractor takes measures to prevent loading within 6 inches of the edge:
 1. The engineer will allow the contractor to open Concrete Base Course to traffic when the concrete reaches 2000 psi (13.8 MPa).
 2. In the absence of compressive strength information, the engineer may allow the contractor to open Concrete Base Course upon the expiration of 3 equivalent curing days.

308.3.2 Concrete Patching

Replace paragraph three with the following:

- (3) The contractor shall cure the concrete as prescribed for concrete pavement in 415.5.10.

308.5 Basis of Payment

Replace paragraph one and two with the following:

- (1) The quantity of Base Patching; Base Patching, Asphaltic; or Base Patching, Concrete; as the case may be, measured as provided above, will be paid for at the contract unit price per ton (Mg), or per square yard (m²). That price shall be full compensation for furnishing all materials, except pavement ties and dowel bars installed in the existing concrete pavement; for the removal of old pavement, including any patching or surfacing materials, with the exception of sawing; for all excavation, except as hereinafter provided; for the preparation of the foundation, including all necessary cutting and trimming, filling of depressions to shape the subgrade to grade and section and satisfactory compaction; for disposal of all removed or excess materials; for furnishing, placing, consolidating, finishing and curing concrete masonry; for furnishing, placing and compacting asphaltic mixture, including the asphalt; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.
- (2) The Department will pay for the quantity of Special High Early Strength Base Patching, Concrete, measured as provided above, at the contract unit price. That price shall be full compensation for furnishing all materials, except pavement ties and dowel bars installed in the existing concrete pavement; for removal of existing concrete pavement, with the exception of sawing; for all excavation except as hereinafter provided; for the preparation of foundation; for the disposal of removed or excess materials; for furnishing, placing, consolidating, finishing, curing and protecting concrete masonry; for preparing and testing concrete cylinders and providing test data; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

PART IV PAVEMENTS

401.2.3 General Requirements

Replace paragraph two with the following:

- (2) The Department may prohibit the use of crushed stone from limestone/dolomite deposits having thinly bedded strata or strata of a shaley nature. The Department may also prohibit the use of aggregates from deposits or formations known to produce unsound material.
-

401.2.4 Soundness

Replace the subsection heading and the entire text with the following:

401.2.4 Sodium Sulfate Soundness

- (1) The Department will conduct five cycles of the sodium sulfate soundness test, by the method prescribed in AASHTO T 104, on aggregate retained on the No. 4 (4.75 mm) sieve. The weighted loss shall not exceed 12 percent.
 - (2) When all aggregates used in the work are produced from the same deposit or source, the test may be made on a composite sample. The composite sample will contain the job mix formula percentages of each component aggregate. When the component aggregates are produced from more than one deposit or source, the tests will be made on one sample from each deposit or source.
-

401.2.7 Sampling and Testing

Replace paragraph one with the following:

- (1) Sampling and testing will be as prescribed in the following AASHTO methods, except as revised with the engineer's approval:

Sampling aggregates.....	T 2
Material finer than No. 200 (75 µm) sieve.....	T 11
Sieve analysis of aggregates.....	T 27
Mechanical analysis of extracted aggregate.....	T 30
Sieve analysis of mineral filler	T 37
Liquid limit of soils	T 89
Plastic limit of soils	T 90
Plasticity index of soils.....	T 90
Los Angeles abrasion of coarse aggregate	T 96
Freeze-thaw soundness of coarse aggregate	T 103
Sodium sulfate soundness of aggregates.....	T 104
Extraction of bitumen	T 164

401.3.1 General Requirements

Replace paragraph five with the following:

- (5) The grade of penetration graded or viscosity graded asphaltic materials, including asphalt emulsions used for tack coat, may be changed by the contractor one step at no change in unit price when permitted by the engineer in writing. No change in the grade of performance graded asphaltic materials will be permitted.

401.3.4 Asphalt, Type AC

Delete the text and table previously added in Supplemental Specifications - 1997 Edition.

Add the following at the end as paragraph five:

- (5) Performance graded asphalt cements shall meet the binder specifications & test method tolerances as tabulated in the most recent edition of the Department's "Certification Method of Acceptance for Asphalt Cements".

402.2 Materials

Replace paragraph two with the following:

- (2) Asphaltic material shall be MS-2, SS-1, SS-1h, CSS-1, CSS-1h, or Modified Emulsified Asphalt, unless otherwise specified in the contract.

402.4.1 General

Replace paragraph three with the following:

- (3) The existing surface designated for tack coat treatment shall receive a coat of asphaltic material of the type and grade specified in the contract. The diluted tack coat material shall be applied at an estimated rate of 1L/10m² of surface area unless otherwise specified in the contract. Daily application shall be limited to approximately that area of surface reasonably expected to be paved during the same day.

403.3.3.1 Required Tests for a Contract of 4600 Megagrams of Mixture or Greater

Replace paragraph one with the following:

- (1) The contractor shall use the methods indicated below, or other methods approved by the engineer, to perform the following tests at a frequency not less than that indicated:

Replace paragraph eight with the following:

- (8) The split portion of the contractor asphaltic mixture and blended aggregate shall be retained for 14 calendar days at the laboratory site by the contractor. This 14-day retention period may be decreased if approved by the engineer. At the completion of the project, the remaining samples may be disposed of with the approval of the engineer. The samples shall be stored in a dry and protected location.

403.3.3.3 Required Tests for a Contract of Less Than 460 Megagrams of Mixture

Correct the subsection number.

Replace the entire text with the following:

- (1) All testing may be waived, by the engineer. If all testing is waived, the item of Quality Management Program, Asphaltic Mixture will not be measured and paid for.

403.3.3.4 Required Tests for Temporary Pavements

Replace the entire text with the following:

- (1) Temporary pavements are defined as those pavements which will be placed and removed before the completion of the contract. All testing may be waived by the engineer.
- (2) If all testing is waived, the item of Quality Management Program, Asphaltic Mixture will not be measured and paid for.

403.3.4.2 Control Charts

Replace paragraph three with the following:

- (3) The following data shall be recorded on the standardized control charts:
- Blended Aggregate Gradation Tests (Sieves - Percent passing) 9.5 mm, 2.36 mm, 600 μ m, 75 μ m
 - Asphalt Content, percent
 - Marshall Bulk Specific Gravity
 - Maximum Specific Gravity
 - Air Voids, percent
 - Voids Mineral Aggregate, percent

403.3.5 Control Limits

Replace the entire text with the following:

- (1) The following control limits for the Job Mix Formula and warning limits are based on a running average of the last four data points:

<u>Item</u>	<u>Job Mix Formula Limits</u>	<u>Warning Limits</u>
Sieve - percent Passing		
9.5 mm	± 5.5	± 4.0
2.36 mm	± 5.0	± 4.0
600 μ m	± 4.5	± 3.5
75 μ m	± 2.0	± 1.5
Asphalt Content, percent	± 0.4	± 0.3
Air Voids, percent	± 1.3	± 1.0
Voids Mineral Aggregate, percent	- 1.5	- 1.2

403.4 Quality Assurance

Replace paragraph four with the following:

- (4) Differences between the contractor's and engineer's split sample test results will be considered acceptable if within the following limits:

<u>Item</u>	<u>Allowable Differences</u>
Sieve - percent Passing	
9.5 mm	6.0
2.36 mm	4.0
600 μ m	3.5
75 μ m	2.0
Marshall Bulk Specific Gravity	0.030
Maximum Specific Gravity	0.020

403.7 Basis of Payment

Add the following at the end as paragraph two:

- (2) If all testing is waived in accordance with provisions of 403.3.3.3 and 403.3.3.4, the item of Quality Management Program, Asphaltic Mixture will not be measured and paid for.

405.3.4 Tack Coat

Replace the entire text with the following:

- (1) Tack coat shall be applied, in accordance with Section 402, to each lower layer and to each upper layer, of a plant-mixed asphaltic base or pavement scheduled to be overlaid with asphaltic mixture under the same contract.

407.2.1.1.2 Soundness

Replace the subsection heading and the entire text with the following:

407.2.1.1.2 Freeze-Thaw Soundness

- (1) The Department will conduct freeze-thaw soundness tests, as prescribed in AASHTO T 103, on crushed stone aggregates produced from sources in limestone/dolomite formations in specified counties when those aggregates are used in surface course layers. The Department will test aggregate retained on the No. 4 (4.75 mm) sieve using either Method A with 50 cycles, Method B with 16 cycles, or Method C with 25 cycles. The weighted average loss shall not exceed 18 percent.
- (2) The Department will test material produced from sources in the following counties:

Brown	Fond du Lac	Jefferson	Outagamie	Winnebago
Columbia	Grant	Lafayette	Rock	
Dane	Green	Marinette	Shawano	
Dodge	Iowa	Oconto	Walworth	
- (3) The Department may waive the requirement for soundness testing by freezing and thawing for existing sources determined to be in either the Silurian System or the Prairie du Chien Group of the Ordovician System of rocks in Wisconsin.
- (4) When all aggregates used in the work are produced from the same deposit or source, the test may be made on a composite sample. The composite sample will contain the job mix formula percentages of each component aggregate. When the component aggregates are produced from more than one deposit or source, the tests will be made on one sample from each deposit or source.

407.2.1.1.4 Aggregate Gradation Master Range

Replace the entire text with the following:

- (1) The aggregates, including mineral filler when required, shall conform to the following gradation requirements. The gradation values listed are the extreme limits for design purposes. Production testing tolerances may allow mixture production values that exceed the aggregate master range.

Sieve Size	Gradation*			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
1-1/2 inch (37.5 mm)	100	---	---	---
1 inch (25.0 mm)	90 - 100	100	---	---
3/4 inch (19.0 mm)	55 - 95	90 - 100	100	---
1/2 inch (12.5 mm)	---	45 - 95	90 - 100	100
3/8 inch (9.5 mm)	---	---	35 - 95	90 - 100
No. 4 (4.75 mm)	15 - 65	20 - 70	25 - 80	30 - 85
No. 8 (2.36 mm)	10 - 50	10 - 55	15 - 60	20 - 65
No. 30 (600 µm)	7 - 30	7 - 40	7 - 40	7 - 45
No. 50 (300 µm)	5 - 20	5 - 25	5 - 25	5 - 30
No. 200 (75 µm)	3 - 8	3 - 8	3 - 8	3 - 8

* Percent passing of total aggregate mass.

407.2.1.3 Salvaged Asphaltic Pavement Materials

Add the following at the end as paragraphs two and three:

- (2) The contractor shall process the salvaged asphaltic pavement stockpile as necessary to permit incorporation in the asphaltic pavement or base.
- (3) The area to be covered by processed stockpiled material shall be cleared and prepared to facilitate recovery of the maximum amount of the stockpiled material. The area on which the processed salvaged asphaltic pavement material is stockpiled shall be free of all clods, lumps or stones exceeding 50 mm.

407.2.1.4 Reclaimed Asphaltic Pavement Materials

Delete paragraphs two, three, and four.

Add the following new subsection:

407.2.1.5 Recovered Asphaltic Materials

- (1) The percentage of asphaltic materials from either salvaged asphaltic pavement or reclaimed asphaltic pavement (RAP) shall be established for the mixture design according to AASHTO T 164 using the appropriate dust correction procedure.
- (2) When test results indicate that a change has occurred in the salvaged or reclaimed asphaltic material percentage, a change in the design percentage of salvaged or reclaimed asphaltic material may be requested by the contractor or the Department. The request shall include at least two recent salvaged or reclaimed asphaltic pavement extractions from the contractor's mixture design laboratory.
- (3) When penetration graded or viscosity graded asphaltic materials are specified in the contract, the blend of new asphaltic material with the extracted asphaltic material from either salvaged asphaltic pavement or RAP shall meet the penetration or viscosity requirements for the originally specified asphaltic materials. The new asphaltic material shall not be more than two standard asphaltic material grades softer than the specified asphaltic material.
- (4) When performance graded (PG) asphaltic materials are specified in the contract, salvaged or reclaimed asphaltic pavement materials may be incorporated into the asphaltic mixture in amounts up to 25% for lower layers and 20% for upper layers without a change in PG grade. If greater amounts of salvaged or reclaimed asphaltic pavement materials are incorporated into the asphaltic mixture, the added asphaltic material shall be one PG grade lower, unless contractor or supplier testing indicates that the resultant blend meets the PG grade originally specified in the contract.

407.2.2.1.1 Definitions

Delete paragraph two under the definition for Manufactured Sand.

407.2.2.1.2 General Requirements

Replace paragraph three with the following:

- (3) The composite aggregate blend shall have a minimum fine aggregate angularity of 45, determined as prescribed in the Department's Test Method 1561.

407.2.2.2 Asphaltic Materials

Replace the entire text with the following:

- (1) The virgin or resultant blended asphaltic material shall be as designated in the contract.

Add the following new subsection:

407.3.1.3 Mixture Design VMA Requirements

- (1) Values in the following table shall apply to lower and upper layers of Asphaltic Concrete Pavement, Types HV, MV and LV, as appropriate.

Gradation	Mixture Design VMA Requirements, Minimum Percent		
	% Passing 2.36 mm Sieve	Coarse Mixture VMA, Min Percent	Fine Mixture VMA, Min Percent
1			
2	25.0	12.0	13.0
3	30.0	12.5	13.5
4	35.0	14.5	15.0
	40.0	15.0	15.5

Coarse Mixture - Mix with a JMF percent passing the 2.36 mm sieve less than or equal to the value shown in the above table.

Fine Mixture - Mix with a JMF percent passing the 2.36 mm sieve greater than the value shown on the above table.

407.3.2.1 Lower Layer

Replace the entire text with the following:

- (1) Gradation 2 (Subsection 407.2.1.1.4) shall be used unless otherwise designated in the contract.
- (2) Mixtures made in the design laboratory with aggregates and asphalt cement proposed for the work shall have the following properties:

	<u>Gradation 1</u>	<u>Gradation 2</u>
No. blows/end	75	75
Stability, min., N	6500	6500
Flow, 0.25 mm	8-16	8-16
Air Voids, percent	4.0	4.0
Percent Passing 75 µm Sieve/ Asphalt Cement Ratio	0.6-1.2	0.6-1.2
Tensile Strength Ratio, min, percent		
No additive	70.0	70.0
With additive	75.0	75.0

407.3.2.2 Upper Layer

Replace the entire text with the following:

- (1) Gradation 3 (Subsection 407.2.1.1.4) shall be used unless otherwise designated in the contract.
- (2) Mixtures made in the design laboratory with aggregates and asphalt cement proposed for the work shall have the following properties:

	<u>Gradation 3</u>	<u>Gradation 4</u>
No. blows/end	75	75
Stability, min., N	6500	6500
Flow, 0.25 mm	8-16	8-16
Air Voids, percent	4.0	4.0
Percent Passing 75 µm sieve/ Asphalt Cement Ratio	0.6-1.2	0.6-1.2
Tensile Strength Ratio, min. percent		
No Additive	70.0	70.0
With Additive	75.0	75.0

407.3.3.1 Lower Layer

Replace the entire text with the following:

- (1) Gradation 2 (Subsection 407.2.1.1.4) shall be used unless otherwise designated in the contract.
- (2) Mixtures made in the design laboratory with aggregates and asphalt cement proposed for the work shall have the following properties:

	<u>Gradation 1</u>	<u>Gradation 2</u>
No. blows/end	50	50
Stability, min., N	5300	5300
Flow, 0.25 mm	8-18	8-18
Air Voids, percent	3.5	3.5
Percent Passing 75 µm Sieve/ Asphalt Cement Ratio	0.6-1.2	0.6-1.2
Tensile Strength Ratio, min., percent		
No additive	70.0	70.0
With additive	75.0	75.0

407.3.3.2 Upper Layer

Replace the entire text with the following:

- (1) Gradation 3 (Subsection 407.2.1.1.4) shall be used unless otherwise designated in the contract.
- (2) Mixtures made in the design laboratory with aggregates and asphalt cement proposed for the work shall have the following properties:

	<u>Gradation 3</u>	<u>Gradation 4</u>
No. blows/end	50	50
Stability, min., N	5300	5300
Flow, 0.25 mm	8-18	8-16
Air Voids, percent	3.5	3.5
Percent passing 75 µm Sieve/ Asphalt Cement Ratio	0.6-1.2	0.6-1.2
Tensile Strength Ratio, min., percent		
No additive	70.0	70.0
With additive	75.0	75.0

407.7.1 General

Replace paragraph two with the following:

- (2) This price shall be full compensation for providing an asphaltic mixture design; for furnishing, preparing, hauling, mixing and placing of all materials, except asphaltic materials; for compacting mixtures; for preparing foundation, unless otherwise provided; and for all labor, tools, equipment and incidentals, including maintenance, necessary to complete the work.
-

410.1 Description

Replace the entire text with the following:

- (1) Salvaged Asphaltic Pavement shall consist of the complete removal of existing asphaltic surfacing at the locations required by the contract or as directed by the engineer, together with hauling and stockpiling of the salvaged material.
- (2) Salvaged Asphaltic Pavement, Milling shall consist of removing and salvaging existing asphaltic pavement by milling at the location and to the thickness indicated in the contract, or directed by the engineer, together with hauling and stockpiling the salvaged material.
- (3) Unless otherwise required in the contract, all salvaged asphaltic pavement material not incorporated in the work shall become the property of the contractor.

410.3.1 Salvaged Asphaltic Pavement

Replace paragraph one with the following:

- (1) The existing asphaltic pavement shall be removed in its entirety, taking all practical care to avoid incorporation of or damage to the underlying materials. Inclusion of excessive amounts of underlying materials or of aggregates from shoulders shall be cause for immediate suspension of the work until corrective procedures are instituted. The asphaltic pavement thus removed shall be stockpiled at a location which will permit incorporation in the asphaltic base, asphaltic pavement or salvaged asphaltic pavement, base course.

Delete paragraphs three and four.

410.3.2 Salvaged Asphaltic Pavement, Milling

Delete paragraphs three, six, and seven.

410.5 Basis of Payment

Replace the entire text with the following:

- (1) Salvaged Asphaltic Pavement, measured as provided above, will be paid for at the contract unit price per megagram, or per square meter, as the case may be, which price shall be full compensation for removing, hauling, and stockpiling; and for furnishing all labor, equipment, tools and incidentals necessary to complete the work.
 - (2) Salvaged Asphaltic Pavement, Milling, measured as provided above, will be paid for at the contract unit price per megagram, or per square meter, as the case may be, which price shall be full compensation for removal by milling, hauling, and stockpiling, and for furnishing all labor, equipment, tools and incidentals necessary to complete the work.
-

Add the following section:

SECTION 411. ASPHALTIC SURFACE**411.1 Description**

- (1) The item of Asphaltic Surface shall consist of the construction of a plant mixed asphaltic surface on the approved prepared foundation, base course or existing surface in accordance with the specifications and in reasonably close conformity with the lines, grades, thicknesses and typical cross sections shown on the plans and as directed by the engineer.
- (2) Asphaltic Surface, Detours shall consist of furnishing and placing an asphaltic surface conforming to the above requirements at various locations and depths on the detour route, as shown on the plans and as directed by the engineer.
- (3) Asphaltic Surface, Patching shall consist of furnishing and placing an asphaltic surface conforming to the above requirements at various patching locations and depths as directed by the engineer.
- (4) Asphaltic Surface, Safety Islands shall consist of furnishing and placing an asphaltic surface at the safety island locations and depths, as shown on the plans or as directed by the engineer.
- (5) Asphaltic Surface, Driveways and Field Entrances shall consist of furnishing and placing an asphaltic surface at the various driveway and field entrance locations and depths, as shown on the plans or as directed by the engineer.
- (6) Asphaltic Surface, Temporary shall consist of furnishing and placing a temporary asphaltic surface at the locations and depths as shown on the plans or as directed by the engineer.

411.2 Materials

- (1) The requirements of Section 401 shall not apply to this work except as required in Section 407 for the production of Type LV or Type MV Asphaltic Concrete Pavement mixtures.

411.3 Composition of Mixture

- (1) The asphaltic mixture for the items of Asphaltic Surface; Asphaltic Surface, Detours; and Asphaltic Surface, Patching shall meet the requirements for either Type LV or Type MV Asphaltic Concrete Pavement as specified in Section 407.
- (2) The asphaltic mixture for the items of Asphaltic Surface, Safety Islands; Asphaltic Surface, Driveways and Field Entrances; and Asphaltic Surface, Temporary shall consist of an intimate mixture of coarse and fine mineral aggregates, with or without salvaged or reclaimed asphaltic pavement materials, uniformly coated and mixed with a Type AC asphaltic material in a suitable mixing plant.

411.4 Construction Methods

411.4.1 General

- (1) The requirements of Section 403 shall not apply to this work. The requirements of Section 405 shall not apply to this work except as hereinafter specified.
- (2) The mixture for the items of Asphaltic Surface, Safety Islands and Asphaltic Surface, Patching may be placed by hand methods described in 405.3.9.

411.4.2 Compaction

- (1) Compaction for the items of Asphaltic Surface; Asphaltic Surface, Detours; Asphaltic Surface, Patching; Asphaltic Surface, Driveways and Field Entrances; and Asphaltic Surface, Temporary shall be accomplished by the Ordinary Compaction Procedure as described in 405.3.10.2.
- (2) Compaction for the item of Asphaltic Surface, Safety Islands shall be accomplished to the extent directed by the engineer.

411.4.3 Surface Requirements

- (1) The surface produced under the items of Asphaltic Surface; Asphaltic Surface, Detours; and Asphaltic Surface, Temporary shall be tested with a 3 m straightedge and shall show no variation greater than 6 mm from the testing edge of the straightedge between any two contracts with the surface. All humps and depressions exceeding the specified tolerance shall be corrected by removing defective work and replacing it with new material or by other methods of repair approved by the engineer.
- (2) The surface produced under the items of Asphaltic Surface, Patching; Asphaltic Surface, Safety Islands; and Asphaltic Surface, Driveways and Field Entrances shall be smooth and contoured as directed by the engineer.

411.5 Maintenance

- (1) The contractor shall be responsible for maintaining the asphaltic surface produced under the item of Asphaltic Surface, Temporary. Maintenance shall be done at no additional cost to the Department and shall be done to the satisfaction of the engineer for the time period specified in the contract. Maintenance furnished by the contractor shall include all labor, materials, equipment, tools and incidentals needed to accomplish the work.

411.6 Method of Measurement

- (1) All items of work described in 411.1 will be measured by the megagram as provided in 405.4.
- (2) Asphaltic materials required for and incorporated in the mixture will not be measured separately for payment.

411.7 Basis of Payment

- (1) The items of Asphaltic Surface; Asphaltic Surface, Detours; Asphaltic Surface, Patching; Asphaltic Surface, Safety Islands; and Asphaltic Surface, Driveways and Field Entrances, measured as provided above, will be paid for at the contract unit price per megagram, which price shall be full compensation for providing an asphaltic mixture design, when required; for furnishing, preparing, hauling, mixing and placing of all materials, including asphaltic material and any salvaged or reclaimed asphaltic pavement materials; for compacting the mixture; for preparing the foundation; and for all labor, tools, equipment and incidentals necessary to complete the work.
 - (2) The item of Asphaltic Surface, Temporary, measured as provided above, will be paid for at the contract unit price per megagram, which price shall be full compensation for furnishing, preparing, hauling, mixing and placing all materials, including asphaltic material and any salvaged or reclaimed asphaltic pavement materials; for compacting the mixture; for preparing the foundation; for maintenance during the time period specified in the contract; and for all labor, tools, equipment and incidentals necessary to complete the work.
-

415.2.2 Concrete

Replace paragraph two with the following:

- (2) The contractor shall provide Grade A, A2, A3, A-S, A-S2, A-IS, A-FA or A-IP Air-Entrained Concrete, as specified in 501, except as otherwise provided for Special High Early Strength Concrete Pavement Repair in 416.2.5 and for Concrete Pavement Repair in 416.2.4.
-

415.2.5 Concrete Curing Agents

Replace the entire text with the following

415.2.5.1 Liquid Membrane-Forming Compounds

- (1) The contractor shall provide liquid curing compound conforming to AASHTO M 148, Type 2, except for water retention testing. The Department will conduct water retention tests as prescribed in AASHTO T 155, except as follows:
 1. The edges of the specimen will not be sealed.
 2. The curing compound will be applied at one gallon per 200 square feet (0.20 L /m²) of surface or at the manufacturer's recommended rate whichever is greater.

415.2.5.2 Burlap

- (1) The contractor shall provide burlap conforming to AASHTO M 182, Class 3 or 4. The contractor may use two layers of Class 1 or 2 in lieu of one layer of Class 3 or 4.

415.2.5.3 (Vacant)

415.2.5.4 Polyethylene Sheeting

- (1) The contractor shall provide polyethylene sheeting conforming to the requirements for white opaque polyethylene film of AASHTO M 171.

415.2.5.5 Polyethylene-Coated Burlap

- (1) The contractor shall provide polyethylene-coated burlap conforming to the requirements for white burlap-polyethylene sheet of AASHTO M 171.

415.5.4 Consistency

Replace the entire text with the following:

- (1) A uniform consistency shall be continuously maintained in consecutive batches of concrete. Slump tests of concrete will be made in accordance with AASHTO T 119. Slump for various techniques shall be as follows:

Slip-Formed	Not Slip-Formed with Internal Vibration	Not Slip-Formed with Surface Vibration
65 mm or less	25 to 75 mm	38 to 75 mm

415.5.6.2 Placing Continuous Pavement Reinforcement

Replace the entire text with the following:

- (1) After the subgrade has been properly prepared, the bar steel reinforcement shall be placed. The longitudinal bars shall be placed on top of the transverse bars and firmly tied or fastened together at each intersection. The assembled bars shall be supported on bar chairs with bars located at a depth as shown on the plans. The bar chairs shall meet the approval of the engineer and shall be sufficient in strength and number to hold the steel reinforcement in required position during the construction operations.
- (2) Splices of longitudinal bars shall be made with the bars lapped as shown on the plans and firmly tied or fastened together. The arrangement of splices shall be as shown on the plans. Additional steel reinforcement as shown on the plans shall be installed at construction joints.
- (3) All bar steel reinforcement left protruding from the slab for any extended period of time shall be protected from deterioration caused by exposure.
- (4) The bar steel reinforcement shall not be bent or subjected to loading or forces which distort the steel or weaken the bond with the concrete.
- (5) Coated bars shall be tied using a procedure, equipment, and materials that will not damage or cut the coating. Ties for use with coated reinforcement shall be an approved plastic or nonmetallic material; stainless steel wire; or nylon, epoxy, or plastic-coated wire.

415.5.9.8.2 Profilograph

Add the following to the beginning as paragraph one:

- (1) The provisions of this subsection shall be applicable to the work when required by special provision in the contract.

415.5.10 Curing of Concrete

Replace the entire text with the following:

415.5.10.1 General

- (1) The contractor shall maintain adequate moisture throughout the concrete mass to support hydration until the concrete has developed sufficient strength to open it to service. The contractor shall cure all concrete by one or a combination of the following methods:
 1. Impervious coating.
 2. Impervious sheeting.
 3. Continuous wet cure.
 4. Alternate method approved by the engineer.

- (2) If the contractor fails to cure concrete as prescribed in this subsection, the engineer may suspend concrete placement operations.

415.5.10.2 Impervious Coating Method

- (1) After finishing operations, and as soon as the free water has disappeared, the contractor shall spray the concrete surface with a uniform coating of curing compound meeting the requirements for curing agents prescribed in 415.2.5.1. The contractor shall seal moisture in the concrete by applying a continuous water-impermeable film on all exposed concrete surfaces.
- (2) The contractor shall provide sufficient agitation during the spraying operation to ensure uniform consistency and dispersion of pigment within the curing compound as applied.
- (3) The contractor shall apply the curing compound with an approved self-propelled mechanical power sprayer where practical. The contractor may use hand-operated spraying equipment for:
 1. Irregular, narrow, or variable width sections.
 2. Re-coating applications or after form removal.
 3. Special applications as approved by the engineer.
- (4) For tined surfaces, the contractor shall apply the curing compound uniformly at a minimum rate of one gallon per 150 square feet (0.27 L/m²). For all other surface finishes, the contractor shall apply the curing compound uniformly at a minimum rate of one gallon per 200 square feet (0.20 L/m²).
- (5) If the curing compound coating is damaged within 72 hours after being applied, the contractor shall recoat the affected area without delay. When forms are removed within 72 hours after placement of the concrete, the contractor shall coat newly exposed surfaces within 30 minutes after form removal.

415.5.10.3 Impervious Sheeting Method

- (1) As soon as the concrete has been finished and has hardened sufficiently to prevent excessive marring, the contractor shall cover all exposed concrete surfaces with one or a combination of the following impervious sheeting materials:
 1. Polyethylene sheeting meeting the requirements for curing agents prescribed in 415.2.5. 4.
 2. Polyethylene-coated burlap meeting the requirements for curing agents prescribed in 415.2.5.5. The polyethylene-coated burlap should be prewetted and placed with the uncoated side against the concrete.
 3. When approved by the engineer, insulated curing blankets with an impervious coating.
 4. Alternate impervious sheeting materials approved by the engineer.
- (2) The contractor shall provide sheeting material sufficient to cover all exposed edges, with enough excess to hold the material securely in place by weighting or an alternate anchoring method. The contractor shall provide a minimum of 12 inches (300 mm) overlap between adjacent pieces of sheeting. The contractor shall place the sheeting material so that it is in direct contact with all exposed concrete surfaces.
- (3) The contractor shall maintain the sheeting material in place until the concrete meets the opening criteria prescribed in 415.5.15. Where temporary removal is required to remove forms or perform other necessary work, the Contractor shall re-cover all exposed concrete as quickly as practical, or as directed by the engineer.
- (4) If approved by the engineer, the contractor may reuse sheeting materials that are in serviceable condition.

415.5.10.4 Continuous Wet Cure Method

- (1) As soon as the concrete has been finished and has hardened sufficiently to prevent excessive marring, the contractor shall spray or fog the exposed surfaces of the concrete to keep it moist until the concrete meets the opening criteria prescribed in 415.5.15. The contractor may choose to apply a layer of thoroughly wetted burlap to protect the surface from the mechanical impact of the spray.
- (2) If there is evidence that the concrete surface is being eroded by the curing water, the engineer will immediately suspend the spraying or fogging. The contractor shall remedy the conditions causing erosion or switch to another curing method.
- (3) When ambient temperatures are predicted to fall below 40 F (5 C) within the next 24 hours, the contractor shall suspend continuous wet curing and switch to another curing method.

415.5.10.5 Alternate Curing Methods

- (1) If requested by the contractor, the engineer may approve the use of alternate materials or curing methods. If requested by the engineer, the contractor shall supply technical specifications, test results, or performance records to support their proposed alternative method.

415.5.13 Cold Weather and Night Concreting

Replace the subsection heading and the entire text with the following:

415.5.13 Cold Weather Concreting

415.5.13.1 General

- (1) The contractor is responsible for the quality of the concrete placed in cold weather. The contractor shall take all precautions necessary to prevent freezing of the concrete until it has developed sufficient strength to open it to service. The contractor shall remove and replace frozen or frost damaged concrete at no expense to the Department.
- (2) Unless the engineer issues written permission to continue, the contractor shall suspend concreting operations when a descending air temperature in the shade and away from artificial heat falls below 35 F (2 C). The contractor shall not resume concreting operations until an ascending air temperature in the shade and away from artificial heat reaches 30 F (-1 C). The engineer may require the contractor to measure the concrete temperature, at the point of placement, when the ambient air temperature falls below 40 F (5 C). The contractor shall maintain the temperature of the concrete at or above 50 F (10 C) at the point of placement.
- (3) If necessary to maintain placement temperature, the contractor may heat the water, aggregates, or both. The contractor shall uniformly heat, with steam or by other means, aggregates that are frozen or contain frost. The contractor shall accurately control the temperature of the mixing water if it is heated. The temperature of either the mixing water or the aggregates shall not exceed 100 F (38 C) when placed together with the cement in the mixer. The contractor shall control the temperature of the water and the aggregates so that the temperature of the concrete discharged from the mixer is between 50 F (10 C) and 80 F (27 C) inclusive.
- (4) The contractor shall not: heat the cement, add salt or chemical admixtures to the concrete mix to prevent freezing, or place concrete on a frozen base or subgrade.

415.5.13.2 Protective Covering

- (1) The contractor shall arrange to have available a sufficient quantity of material to provide thermal protection for concrete that has yet to meet the opening criteria prescribed in 415.5.15. The contractor may provide clear, black, or white polyethylene sheeting meeting the requirements, except for color and reflectance, prescribed in 415.2.5.4. The engineer may allow other curing materials with suitable water resistance, strength, and insulating properties.
- (2) When the official Weather Bureau forecast for the construction area predicts temperatures of less than 17 F (-8 C) within the next 24 hours, the contractor shall arrange to have available a sufficient quantity of straw or hay to protect all concrete that has yet to meet the opening criteria prescribed in 415.5.15. When approved by the engineer, the contractor may use other materials placed to the

thickness necessary to provide the same insulating protection as the required thickness of loose, dry straw or hay.

- (3) At any time of the year, when the official Weather Bureau forecast for the construction area predicts freezing temperatures within the next 24 hours or when freezing temperatures actually occur, the contractor shall provide the minimum level of thermal protection prescribed below for concrete that has yet to meet the opening criteria prescribed in 415.5.15.

<u>PREDICTED OR ACTUAL AIR TEMPERATURE</u>	<u>MINIMUM EQUIVALENT LEVEL OF PROTECTION</u>
22 to <28 F (-6 to <-2 C)	single layer of polyethylene
17 to <22 F (-8 to <-6 C)	double layer of polyethylene
<17 F (<-8 C)	6" of loose, dry straw or hay between two layers of polyethylene

- (4) The contractor shall place protective material as soon as the concrete has been finished and has set sufficiently to prevent excessive marring of the surface. The contractor shall maintain the protective material in place until the concrete meets the opening criteria prescribed in 415.5.15. Where removal of the coverings is necessary to saw joints or perform other required work, and if approved by the engineer, the contractor may remove the covering for the minimum time required to complete that work.

415.5.15 Opening to Traffic

Replace the subsection heading and the entire text with the following:

415.5.15 Opening to Service

415.5.15.1 General

- (1) The contractor shall maintain moisture, temperature, and physical protection for concrete until it has developed sufficient strength to open it to service. The engineer will use the same criteria to allow the opening of non-pavement concrete items to service as is used to allow the opening of pavement items to traffic.
- (2) The engineer will allow the contractor to open pavement to construction and public traffic when the concrete attains a verified compressive strength of 3000 psi (20.7 MPa). In the absence of compressive strength information, the engineer may allow the contractor to open pavement upon the expiration of the following minimum time periods as adjusted for changes in the ambient air temperature on the project.

<u>APPLICATION</u>	<u>EQUIVALENT CURING DAYS</u>
High early strength concrete	3
General purpose concrete (Grades A, A2, and A3)	4
General purpose concrete (Grades A-FA and A-IP)	5
General purpose concrete (Grades A-S, A-S2, and A-IS)	7

- (3) The equivalent curing day is based on a daily average ambient temperature of 60 F (16 C). The daily average ambient temperature is calculated as the average of the high and low temperatures on the project site, as recorded by the project engineer, for each day. When this daily average ambient temperature falls below 60 F (16 C), equivalent curing days are accumulated at a reduced rate. For a daily average ambient temperature of:
1. 60 F (16 C) or more; accumulate 1 equivalent curing day per calendar day.
 2. 40 to less than 60 F (4 to <16 C); accumulate 0.6 equivalent curing day per calendar day.
 3. Less than 40 F (<4 C); accumulate 0.3 equivalent curing day per calendar day.
- (4) The contractor may operate concrete saws and profilographs on concrete not meeting these opening criteria. When approved by the engineer, the contractor may operate other necessary light equipment on concrete not meeting these opening criteria. The engineer may suspend or delay operations that injure the surface or otherwise damage the concrete. The contractor shall clean the surface before traffic of any kind is permitted to use the pavement.

415.5.15.2 Opening Strength

415.5.15.2.1 General

- (1) The contractor shall determine opening strength and provide the engineer with the information required to verify that strength by one or a combination of the following methods:
 1. Compressive strength testing of cylinders.
 2. Maturity method.
 3. Compressive strength testing of cores.
- (2) The resulting opening strength, when verified by the engineer, will apply to concrete on the same project meeting the following criteria:
 1. Of the same mix design as the test location.
 2. Cured under similar or more desirable conditions.
 3. Placed on or before the test location.
- (3) When neither direct compressive strength test results nor maturity data are available, the engineer may estimate compressive strength based on test results of concrete of the same mix design placed contiguously under similar conditions on the same project.

415.5.15.2.2 Compressive Strength Testing of Cylinders

- (1) The contractor shall submit the compressive strength test results to the engineer for verification. The contractor shall compute the opening strength as the average of compressive strength test results for two cylinders. When the strength of a cylinder is less than 90 percent of the required strength, the engineer will reject the resulting average. The contractor shall field cure cylinders under conditions similar to those prevailing for the pavement they represent. The contractor shall fabricate cylinders as prescribed in AASHTO T 23 and test the cylinders as prescribed in AASHTO T 22. The Department will consider costs associated with the fabrication and testing of concrete cylinders for the determination of opening strength as incidental to the related concrete bid item.

415.5.15.2.3 Compressive Strength Testing of Cores

- (1) The contractor shall submit the core test results to the engineer for verification. The contractor shall determine the opening strength from the compressive strength of cores obtained and tested as prescribed in AASHTO T 24. The Department will consider costs associated with obtaining and testing cores for the determination of opening strength as incidental to the related concrete bid item.

415.5.15.2.4 Maturity Method

- (1) The contractor shall submit the maturity test results to the engineer for verification. The contractor shall determine the opening strength from the maturity of the in-place concrete, as prescribed in ASTM C1074, using the temperature-time factor method with a 32 F (0 C) datum temperature. The contractor shall provide the engineer with a strength/maturity calibration curve based on either laboratory developed strength results or on strength results from test slabs incorporated in the project. The contractor shall develop a new strength/maturity calibration curve whenever the mix design is changed. The Department will consider costs associated with maturity evaluation for the determination of opening strength as incidental to the related concrete bid item.

415.5.16 Tolerance in Pavement Thickness

Replace the entire text with the following:

415.5.16.1 General

- (1) The pavement shall be constructed to the thickness shown on the plans. Determination of the pavement thickness will be based on an acceptance program that considers the results of the following:
 1. Contractor Quality Control Tests.
 2. Validation of Contractor Quality Control Test Procedures.
 3. Verification Tests.
 4. Dispute Resolution Process.
- (2) Contractor probing of the freshly placed concrete will be the primary method for determination of thickness. Acceptance and payment will be based on the contractor's quality control tests until it can be shown through the validation, verification, or dispute resolution process that the contractor's test results are in error. The required contractor quality control test measurements shall be recorded and will become part of the permanent project record.
- (3) Areas with deficient thickness, as defined below, will be determined by coring and accepted and paid for as prescribed in 415.7.1.2.

415.5.16.2 Definitions

- (1) These definitions are used to describe thickness within 415.5.16.

Acceptable Greater than or equal to the plan thickness minus 3/8 inch (10 mm).

Marginal Greater than or equal to the plan thickness minus 1 inch (25 mm) but less than the plan thickness minus 3/8 inch (10 mm).

Deficient Less than the plan thickness minus 1 inch (25 mm).

Measured Thickness The thickness determined as the average of the contractor quality control measurements taken for a pavement unit.

Final Thickness The thickness determined after validation, verification, and resolution of disputes for an area of pavement.

415.5.16.3 Pavement Units

- (1) Generally, the pavement shall be divided into basic units 250 feet (80 m) long, measured along the pavement centerline. Fractional units less than 250 feet (80 m) but greater than or equal to 100 feet (30 m) long shall be considered a whole basic unit. Fractional units less than 100 feet (30 m) long shall be included as a part of a contiguous basic unit.
- (2) The width of a basic unit shall be one lane, as measured from the pavement edge to the adjacent longitudinal joint; from one longitudinal joint to the next; or between pavement edges where there is no longitudinal joint.
- (3) Special units shall be established for areas of fillets, intersections, gaps, ramps and other special areas not included in basic units.

415.5.16.4 Contractor Quality Control Tests

415.5.16.4.1 General

- (1) The measured thickness of a pavement unit shall be determined as:
 1. For a basic unit containing no deficient areas, the average of the two required contractor probings made within that unit.
 2. For a special unit containing no deficient areas, the average of the available measurements made within that unit as agreed upon by the engineer.

3. For units containing deficient areas, the average thickness of the remaining portion of that unit that has not been defined as deficient. This determination shall be based on adjacent required tests and, if agreed upon by the engineer, may include additional measurements provided by the contractor.
- (2) In computing the measured thickness for a unit, individual measurements in excess of the plan thickness by more than 1/4 inch (6 mm) shall be considered as the plan thickness plus 1/4 inch (6 mm).

415.5.16.4.2 Probing Method

- (1) The contractor shall make a series of two probings for each basic unit. Both probings shall be at a single longitudinal location selected at random. Individual probings shall be at transverse locations as agreed upon by the engineer. The probing locations may be changed as approved or directed by the engineer.
- (2) All probing tests shall be conducted as prescribed in Subsection 13.20.9 of the Department's Construction and Materials Manual.

415.5.16.4.3 Alternate Methods

- (1) An alternate method, agreeable to the engineer, may be employed to determine the measured thickness of special units. The contractor shall measure the depth of a special unit at a minimum of two locations as agreed upon by the engineer. Contractor measurements and a brief description of the method employed shall be recorded and will become part of the permanent project record.

415.5.16.5 Validation of Contractor Quality Control Test Procedures

- (1) The engineer will periodically observe the contractor's testing procedure to assure that the test is being performed properly. At the engineer's request, the probing assembly shall be brought to the edge of the pavement for the engineer to validate the accuracy of the measurements recorded by the contractor.

415.5.16.6 Verification Tests

- (1) The engineer will use probing to verify that the pavement thickness is acceptable. Verification tests will be performed at a frequency of at least once for each half-day of paving. The engineer may elect to increase the verification testing frequency as necessary to assure that the pavement has an acceptable thickness.
- (2) The engineer will select a longitudinal location at random and designate the transverse positions for a series of two probings in each lane of pavement at that location. The contractor shall perform the probing as prescribed in Subsection 13.20.9 of the Department's Construction and Materials Manual. The engineer will be present and observe both placement of the plates and probing of the freshly placed concrete.
- (3) The engineer will record the individual measurements and calculate the average thickness for each lane. In computing the average thickness for verification tests, measurements in excess of the plan thickness by more than 1/4 inch (6 mm) will be considered as the plan thickness plus 1/4 inch (6 mm). The engineer will make available the results of the verification tests to the contractor without delay.
- (4) When verification tests indicate acceptable thickness, the final thickness will be accepted as equal to the contractor's measured thickness for the affected pavement and no further action is required.
- (5) When verification tests indicate marginal or deficient thickness and the contractor's tests do not, the contractor and engineer will jointly investigate that discrepancy immediately. If this investigation does not lead to a mutually agreeable explanation of the discrepancy, either the contractor or the engineer may invoke the dispute resolution provisions as prescribed in 415.5.16.7 to determine the final thickness of the affected pavement.
- (6) Where the contractor and engineer agree that the pavement is deficient, the extent of the deficient area will be determined as prescribed in 415.5.16.10.

415.5.16.7 Dispute Resolution

- (1) Resolution of a disputed thickness will be based on coring. Dispute resolution coring will be performed by the engineer as prescribed in AASHTO T 24 and evaluated by the engineer as prescribed in AASHTO T 148. Costs associated with dispute resolution coring, except costs for filling of the holes with concrete or mortar, will be shared equally by the contractor and the Department.

415.5.16.8 Acceptable Areas

- (1) When the final thickness of a pavement unit is acceptable, no more measurements are required and that unit will be paid for at the full contract price.

415.5.16.9 Marginal Areas

- (1) When the final thickness of a pavement unit is marginal, the pay adjustment for that unit will be contingent upon the final thickness of the next unit in that lane. If the location for the next required random probing series is within 125 feet (40 m) of the first test location, the contractor may select and document a new random location to provide space for corrective action.
- (2) If the final thickness of the next unit is acceptable, then no pay adjustments will be assessed for either unit. If the final thickness of the next unit is not acceptable, pay will be adjusted for both units. Pay adjustment will continue for each succeeding unit until a unit with acceptable final thickness is produced.

415.5.16.10 Deficient Areas

- (1) Pavement will be considered deficient if one or more of the following is true:
 1. An individual required contractor probe measurement is deficient.
 2. The outcome of an investigation of a discrepancy between contractor and verification test results indicates a deficient final thickness.
 3. A dispute resolution core is deficient.
- (2) The engineer will take additional measurements by coring of the hardened concrete to determine the extent of this deficient area. Cores will be taken at points approximately 20 feet (6 m) in each direction of the deficient measurement on a line generally parallel to the centerline or longitudinal axis of the unit. Coring will continue until a core that is not deficient is located in each direction. The limits of the deficient area will be determined, at each end, by lines drawn across the unit of pavement midway between the location of the last two cores.
- (3) Core testing will be performed by the engineer as prescribed in AASHTO T 24 and evaluated by the engineer as prescribed in AASHTO T 148. Coring, including filling of the holes with concrete or mortar, shall be paid for by the contractor.

415.7.1 Concrete Pavement

Replace the entire text with the following:

415.7.1.1 General

- (1) Except as otherwise provided in 415.7.1.2 for pavement thinner than plan thickness minus 3/8 inch (10 mm), the quantity completed and accepted, measured as provided above, will be paid for at the contract unit price per square yard (m²) for Concrete Pavement. This price shall be full compensation for furnishing, hauling, preparing, placing, curing and protecting of all materials, including cement, concrete masonry, joints and joint materials, dowels and tie bars, unless otherwise provided; for preparing foundation, unless otherwise provided; for thickness measurement, except as prescribed in 415.5.16.7; for filling all core holes; for furnishing, operating, maintaining and repairing a profilograph, performing profilograph testing of the pavement surface, providing all special traffic control required for profilograph testing, and performing all necessary corrective actions and corrective work associated with profilograph testing, all if required by special provision in the contract; and for all labor, equipment, tools and incidentals necessary for constructing the pavement complete, exclusive of reinforcement.

415.7.1.2 Pay Adjustment for Final Thickness

- (1) Payment, for pavement units subject to pay adjustment as prescribed in 415.5.16, will be:

<u>For Pavement With a Final Thickness Thinner Than Plan Thickness By:</u>	<u>Percent of the Contract Unit Price</u>
more than 3/8 inch (10 mm) but less than or equal to 1/2 inch (15 mm)	80
more than 1/2 inch (15 mm) but less than or equal to 3/4 inch (20 mm)	60
more than 3/4 inch (20 mm) but less than or equal to 1 inch (25 mm)	50

- (2) Areas of pavement determined to have deficient final thickness, as prescribed in 415.5.16.10, shall be either:
 1. Removed and replaced by the contractor with concrete pavement of acceptable thickness and paid for at the full contract price.
 2. Left in place, if permitted by the engineer, and not paid for.

416.1 Description

Replace paragraph four with the following:

- (4) Pavement Terminal Units shall consist of the construction of pavement terminal units, at the locations and in accordance with the design and details shown on the plans. A pavement terminal unit shall consist of a reinforced concrete sleeper slab and a structural steel wide flange beam. The work shall conform to the curing requirements for Concrete Pavements prescribed in 415.5.10.

Replace paragraphs eleven and twelve with the following:

- (11) Concrete Surface Drains shall consist of the construction of concrete surface drains of the design shown on the plans or as modified by the engineer, at the required locations. The work shall conform to the curing requirements for Concrete Pavements prescribed in 415.5.10.
- (12) Concrete Headers shall consist of construction of a header block extending the full width of the pavement, at the locations and of the design shown on the plans. The work shall conform to the curing requirements for Concrete Pavements prescribed in 415.5.10.

416.2.1 Pavement Terminal Units

Replace paragraph one with the following:

- (1) Concrete masonry used in the work shall conform to the requirements for concrete masonry Grade A, A-S, A-IS, A-FA, A-IP, C, C-S, C-IS, C-FA or C-IP as specified under Section 501. Reinforcement steel shall conform to the requirements of Section 505.

416.2.6 Concrete Pavement Gaps

Replace the entire text with the following:

- (1) The contractor shall construct gaps with concrete of the same proportions as specified for the contiguous pavement. If the contractor obtains permission, as prescribed in 416.3.9, to pave through the gap; the contractor shall provide concrete of the proportions specified for Grade E in 501.5.2 and that meets all the other requirements for the contiguous pavement; use Grade A or A2 air-entrained high early strength concrete; or substitute Grade C air-entrained concrete.

416.3.1 Concrete Pavement Approach Slab

Delete paragraph five.

416.3.7 Concrete Pavement Repair

Delete paragraphs five and six.

416.3.8.5 Curing

Delete the entire text and replace the subsection heading with the following:

416.3.8.5 (Vacant)

416.3.9 Concrete Pavement Gaps

Replace the entire text with the following:

- (1) The contractor shall form gaps by constructing a transverse construction joint as prescribed in 415.5.8 or, if approved by the engineer, by an alternate method. If approved by the engineer, the contractor may elect to pave continuously through the gap.

416.3.10 Continuous Diamond Grinding

Replace paragraph six with the following:

- (6) Solid and liquid residue from grinding shall be removed from the roadway by vacuuming. Residue and water shall not be permitted to flow or be blown across lanes used by public traffic; or to enter any storm sewer, stream, lake, reservoir or marsh. Residue and water shall be disposed of at an acceptable material disposal site, except that residue from pavements in rural areas may be disposed of on the roadway, beyond the shoulder edge, in a manner satisfactory to the engineer.

416.5 Basis of Payment

Replace paragraph nine with the following:

- (9) The Department will pay for Concrete Pavement Gaps, measured as provided above, at the contract unit price. This price shall be full compensation for furnishing, hauling and placing all materials used to form the header; for forming the header; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. If the contractor obtains permission, as prescribed in 416.3.9, to pave through the gap; the Department will pay the full contract price for each gap eliminated. Payment for furnishing and placing concrete material is included under the item of Concrete Pavement.

PART V STRUCTURES

Add the following new subsection:

501.3.4.4 Non-Chloride Accelerating Admixtures

- (1) Non-chloride accelerating admixtures incorporated in concrete masonry shall conform to AASHTO M 194, Type C or Type E.

501.3.6.3.6 Size Requirements

Replace the entire text with the following:

- (1) Fine aggregate shall be well graded from coarse to fine and shall conform to the following gradation requirements:

<u>Sieve Size</u>	<u>Percentage Passing by Mass</u>
3/8 in. (9.5 mm).....	100
No. 4 (4.75 mm).....	90 - 100
No. 8 (2.36 mm).....	80 - 100
No. 16 (1.18 mm).....	50 - 85
No.30 (600 µm).....	25 - 60
No. 50 (300 µm).....	10 - 30*
No. 100 (150 µm).....	2 - 10*

* For fine aggregate used in concrete pavement, base course, or Grade E concrete, minima passing the No. 50 (300 µm) and No. 100 (150 µm) sieves may be reduced to 5 and 0 percent, respectively.

501.3.6.4.4 Physical Properties

Replace the entire text with the following:

- (1) The Department will conduct the wear test by the method prescribed in AASHTO T 96. The percent wear shall not exceed 50.
- (2) The Department will conduct five cycles of the sodium sulfate soundness test, by the method prescribed in AASHTO T 104, on aggregate retained on the No. 4 (4.75 mm) sieve. The weighted loss shall not exceed 12 percent.
- (3) The Department will conduct freeze-thaw soundness tests, as prescribed in AASHTO T 103, on crushed stone aggregates produced from sources in limestone/dolomite formations in specified counties when those aggregates are used in concrete pavements or bridge decks. The Department will test aggregate retained on the No. 4 (4.75 mm) sieve using either Method A with 50 cycles, Method B with 16 cycles, or Method C with 25 cycles. The weighted average loss shall not exceed 18 percent.
- (4) The Department will test material produced from sources in the following counties:

Brown	Fond du Lac	Jefferson	Outagamie	Winnebago
Columbia	Grant	Lafayette	Rock	
Dane	Green	Marinette	Shawano	
Dodge	Iowa	Oconto	Walworth	
- (5) The Department may waive the requirement for soundness testing by freezing and thawing for existing sources determined to be in either the Silurian System or the Prairie du Chien Group of the Ordovician System of rocks in Wisconsin.
- (6) The Department may prohibit the use of crushed stone from limestone/dolomite deposits having thinly bedded strata or strata of a shaly nature. The Department may also prohibit the use of aggregates from deposits or formations known to produce unsound material.
- (7) When all coarse aggregates used in the work are produced from the same deposit or source, the tests for wear, sodium sulfate soundness, and soundness by freezing and thawing will be made on a composite sample. The composite sample will contain equal percentages of each component

coarse aggregate incorporated in the work. When the component coarse aggregates are produced from more than one deposit or source, the tests for wear, sodium sulfate soundness, and soundness by freezing and thawing will be made on one sample from each deposit or source.

501.3.6.4.5 Size Requirements

Replace paragraph four with the following:

- (4) The contractor shall provide coarse aggregate consisting entirely of Size No. 1 as follows:
 1. When approved by the engineer, for concrete masonry Grade A, A2, A3, A-FA, A-IP, A-S, A-S2, or A-IS.
 2. Except for concrete pavement repair and when Grade C, C-FA, C-S, C-IS, or C-IP is substituted for Grade A Air Entrained High Early Strength Concrete as provided in 501.4.1, for concrete masonry Grade C, C-FA, C-S, C-IS, or C-IP.
 3. When approved by the engineer, for concrete masonry Grade D.
 4. Except for concrete pavement repair, for concrete masonry Grade E.
 5. For concrete masonry in prestressed concrete members.

501.3.6.5 Sampling and Testing

Replace paragraph one with the following:

- (1) Sampling and testing will be as prescribed in the following AASHTO methods, except as revised with the engineer's approval:

Sampling aggregates	T 2
Lightweight pieces in aggregate	T 113
Material finer than No. 200 (75 µm) sieve	T 11
Unit mass of aggregate	T 19
Organic impurities in sands	T 21
Sieve analysis of aggregates	T 27
Effect of organic impurities in fine aggregate	T 71
Los Angeles abrasion of coarse aggregate	T 96
Freeze-thaw soundness of coarse aggregate	T 103
Sodium sulfate soundness of aggregates	T 104
Specific gravity and absorption of fine aggregate	T 84
Specific gravity and absorption of coarse aggregate	T 85
Sampling fresh concrete	T 141
Making and curing concrete compressive strength test specimens	T 23
Compressive strength of molded concrete cylinders	T 22

501.3.7 Fly Ash

Replace paragraph three with the following:

- (3) The contractor shall have the fly ash tested by a recognized laboratory as defined in 501.3.3, 30 days prior to the proposed use of the fly ash and every 30 days during the progress of the work. The manufacturer shall have daily uniformity tests conducted on the fly ash. These daily uniformity tests shall consist of a determination of the specific gravity, percent retained on the 45 mm sieve, loss on ignition, moisture content, sulfur trioxide content, and air content of the mortar. The Department may reduce the required frequency of the uniformity testing for specific tests on specific fly ash sources when statistical analysis of current data shows no significant probability of exceeding uniformity or specification limits.

501.3.8 Slag

Replace the entire text with the following:

- (1) For Grade A-S, A-S2, B-S, and C-S concrete, the contractor shall provide ground granulated blast furnace slag conforming to ASTM C 989, Grade 100 or 120.
-

501.4.3 Grades of Concrete

Replace the entire text with the following:

501.4.3.1 General

- (1) Unless otherwise provided in the contract, and except as provided for pre-stressed concrete members in 503 and for Special High Early Strength Concrete Pavement Repair in 416.2.5, the contractor shall provide the grade of concrete as prescribed below in 501.4.3.2 or 501.4.3.3. When the contractor selects and uses a specific grade of concrete for an item of work, the contractor shall use that grade throughout the entire construction of the item, except as specified in 501.4.3.3 or as approved by the engineer.

501.4.3.2 Special Restrictions

- (1) When the geologic composition of the coarse aggregate is primarily igneous or metamorphic materials, the contractor shall provide concrete for concrete pavement, approach slabs, barrier walls, surface drains, driveways, alleys, sidewalks, and curb and gutter as follows:

Grade A, A-FA, and A-S : When Type II portland cement is used.

Grade A-S2 : When these items are placed by a slip-formed process and Type II portland cement is used.

Grade C, C-FA, C-S, C-IS, and C-IP : When Types I or III portland cement are used.

501.4.3.3 General Use

- (1) For all concrete not included under 501.4.3.2, the contractor shall use the grade of concrete for different items of work as follows:

Grade A, A-FA, A-S, A-IS, and A-IP : Except as specified for other grades; for Concrete Pavement, Concrete Masonry in structures, and incidental construction.

Grade A-FA, A-S, A-IS, A-IP and D : Concrete Masonry for structures when used in decks, curbs, railings, parapets, medians and sidewalks.

Grade A2 and A-S2, : For Concrete Pavement, Curb, Gutter, Curb and Gutter, Barrier Wall, or Sidewalk when these items are placed by a slip-formed process.

Grade A3 : For Concrete Pavement and incidental construction on low volume State Trunk Highways and other roads under municipal or local jurisdiction in areas where a proven performance record exists for similar mixes. Use only in locations and applications specifically delineated in the contract.

Grade B, B-FA, B-S, B-IS, and B-IP : For Concrete Base Course.

Grade C, C-FA, C-S, C-IS, and C-IP : For concrete pavement repair and other uses when required in the contract.

Grade D : For Concrete Masonry, Seal modified as provided in 502.3.6.3.

Grade E : For Concrete Masonry overlays and repairs on decks of structures and approaches.

501.5.2 Proportions for Concrete

Replace the "Proposed Master Limits of Job Mix" table with the following:

PROPOSED MASTER LIMITS OF JOB MIX (US Standard Measure)

Specified Quantities for a Nominal Cubic Yard of Concrete⁽¹⁾

Concrete	Class C		Grade 100 or 120	Total Aggregate	Fine Aggregate	Mix Water (Gallons)		
	Grade ^{(2) (3) (6)}	Cement (lb) ^{(4) (5)}	Fly Ash (lb)	Slag (lb) ⁽⁷⁾	Fine + Coarse (lb)	Percent of Total Agg ⁽⁸⁾	Design	Max.
A	565	—	—	—	3120	30-40	27	32
A2	530	—	—	—	3190	"	25	30
A3	517	—	—	—	3210	"	25	30
A-FA	480	110	—	—	3060	"	28	33
A-S	395	—	—	170	3100	"	27	32
A-S2	285	—	—	285	3090	"	27	32
A-IP	590	—	—	—	3060	"	28	33
A-IS	565	—	—	—	3090	"	27	32
B	400	—	—	—	3300	"	25	31
B-FA	340	80	—	—	3270	"	25	31
B-S	200	—	—	200	3280	"	25	31
B-IP	420	—	—	—	3270	"	25	31
B-IS	400	—	—	—	3280	"	25	31
C	660	—	—	—	2980	"	30	36
C-FA	560	130	—	—	2900	"	31	37
C-S	330	—	—	330	2950	"	30	36
C-IP	690	—	—	—	2900	"	31	37
C-IS	660	—	—	—	2950	"	30	36
D	610	—	—	—	3040	"	29	34
E	823	—	—	—	2810	50	32	35

⁽¹⁾ A "nominal" cubic yard or a "nominal" cubic meter, by definition, has the specified weight of cement and total aggregate, the "design" mix water, and 6.0 percent air.

⁽²⁾ For all Grades, the contractor shall use a water reducing admixture meeting the requirements of 501.3.4.3 and 501.5.4.4.

⁽³⁾ For all Grades, the contractor shall provide air entrainment as prescribed in 501.5.4.2.

⁽⁴⁾ The contractor shall only use Type IP cement in Grade A-IP, B-IP, and C-IP.

⁽⁵⁾ The contractor shall only use Type IS cement in Grades A-IS, B-IS, and C-IS.

⁽⁶⁾ The contractor shall use a water reducing admixture, as prescribed in 501.5.4.4, for Grade D. The contractor shall not use Type A (M 194) water reducing admixture when a set retarding admixture is used as required in 501.5.4.3.2.

⁽⁷⁾ The contractor shall only use Grade 120 slag for Grade C-S concrete.

⁽⁸⁾ For mixes using crushed stone or recycled concrete coarse aggregate, the engineer may allow up to 45 percent fine aggregate to improve workability.

⁽⁹⁾ For all Grade A-FA, A-S, A-IP and A-IS concrete used in bridge substructures, the contractor may use a non-chloride accelerating admixture meeting the requirements of 501.3.4.4.

PROPOSED MASTER LIMITS OF JOB MIX (SI Metric)
Specified Quantities for a Nominal Cubic Meter of Concrete ⁽¹⁾

Concrete	Class C		Grade 100 or 120	Total Aggregate	Fine Aggregate	Mix Water (Liters)	
	Grade (2) (3) (6)	Cement (kg) (4) (5)	Fly Ash (kg)	Slag (kg) (7)	Fine + Coarse (kg)	Percent of Total Agg (8)	Design
A	335	—	—	1854	30-40	134	157
A2	315	—	—	1892	"	126	148
A3	307	—	—	1907	"	123	147
A-FA	285	65	—	1815	"	140	165
A-S	235	—	100	1843	"	135	158
A-S2	169	—	169	1836	"	135	159
A-IP	350	—	—	1815	"	140	165
A-IS	335	—	—	1836	"	135	159
B	237	—	—	1959	"	126	154
B-FA	202	48	—	1942	"	125	155
B-S	119	—	119	1948	"	126	155
B-IP	249	—	—	1942	"	125	155
B-IS	237	—	—	1948	"	126	155
C	392	—	—	1766	"	149	176
C-FA	332	77	—	1723	"	155	184
C-S	196	—	196	1752	"	149	176
C-IP	410	—	—	1723	"	155	184
C-IS	392	—	—	1752	"	149	176
D	362	—	—	1803	"	145	170
E	488	—	—	1667	50	156	171

⁽¹⁾ A "nominal" cubic yard or a "nominal" cubic meter, by definition, has the specified weight of cement and total aggregate, the "design" mix water, and 6.0 percent air.

⁽²⁾ For all Grades, the contractor shall use a water reducing admixture meeting the requirements of 501.3.4.3 and 501.5.4.4.

⁽³⁾ For all Grades, the contractor shall provide air entrainment as prescribed in 501.5.4.2.

⁽⁴⁾ The contractor shall only use Type IP cement in Grade A-IP, B-IP, and C-IP.

⁽⁵⁾ The contractor shall only use Type IS cement in Grades A-IS, B-IS, and C-IS.

⁽⁶⁾ The contractor shall use a water reducing admixture, as prescribed in 501.5.4.4, for Grade D. The contractor shall not use Type A (M 194) water reducing admixture when a set retarding admixture is used as required in 501.5.4.3.2.

⁽⁷⁾ The contractor shall only use Grade 120 slag for Grade C-S concrete.

⁽⁸⁾ For mixes using crushed stone or recycled concrete coarse aggregate, the engineer may allow up to 45 percent fine aggregate to improve workability.

⁽⁹⁾ For all Grade A-FA, A-S, A-IP and A-IS concrete used in bridge substructures, the contractor may use a non-chloride accelerating admixture meeting the requirements of 501.3.4.4.

501.5.5 Fly ash

Delete the entire text and replace the subsection heading with the following:

501.5.5 (Vacant)

501.5.6 Slag

Delete the entire text and replace the subsection heading with the following:

501.5.6 (Vacant)

501.7.4 Admixtures

Replace the entire text with the following:

501.7.4.1 General

- (1) Admixtures may be proportioned by volume or by mass. The contractor shall follow an approved procedure for adding the specified amount of each admixture. Admixtures shall be added during initial batching of the concrete except as provided in 501.7.4.2.
- (2) When more than one admixture is used, each admixture shall be added in a manner which precludes intermixing of the admixtures prior to incorporation in the mixture. The admixture may be introduced into the water line, directly into the mixer during the introduction of the water or be uniformly dispensed into the fine aggregate just prior to incorporation in the mix.

501.7.4.2 Field Addition of Air-Entraining Admixtures

- (1) Retempering with air-entraining admixtures will be permitted at the site of the work for concrete delivered in truck mixers.
 - (2) When addition of air entraining admixture is needed at the site of the work to raise the air content of the concrete above the lower specification limit, it shall be measured in a calibrated container and then added to the mixer in a dilute solution with water. The concrete shall then be mixed at mixing speed for at least 30 revolutions prior to discharge.
-

501.8.2 Delivery

Replace paragraph three with the following:

- (3) For Ready-Mixed Concrete delivered in agitating vehicles, the contractor shall deliver and completely discharge the concrete within the following limits, beginning when water is added to the cement or when cement is added to the aggregates.
 1. 1 hour for air temperature 60 F (16 C) or higher at placement when the contractor does not use an approved retarder.
 2. 1.5 hour for air temperature less than 60 F (16 C) at placement.
 3. 1.5 hour for air temperature 60 F (16 C) or higher at placement and the contractor uses an approved retarder.
-

501.8.3 Mixers and Mixing

Replace paragraphs eleven through seventeen with the following:

- (11) When concrete is mixed in a truck mixer, the contractor shall mix each batch for 70 or more revolutions at the manufacturer designated mixing speed. No batch shall have more than 300 total revolutions, the sum of the revolutions at mixing and agitating speeds. All materials, including mixing water, shall be in the mixer before revolutions are started.
- (12) The mixing water shall be added at the batching plant, but if additional mixing water is required to obtain the specified slump, water may be added with the permission of the engineer. The total of all free and added water shall not be in excess of that permitted elsewhere in these specifications. If additional water is added at the site of the work, a minimum of 20 revolutions of the truck mixer at mixing speed will be required before discharge of any concrete. The additional water shall be added

and the additional mixing done at the site of the work within 45 minutes after the introduction of the mixing water to the cement or the cement to the aggregates. The time limit for adding water and additional mixing may be extended, by the engineer, to 75 minutes for those grades of concrete mixed under the conditions described in Subsection 501.8.2 for which the delivery time limit is 1-1/2 hours. When additional revolutions at mixing speed are required because of water added at the site the sum of the revolutions at mixing and agitating speeds shall not exceed 300.

- (13) When a truck mixer or agitator is used to transport concrete completely mixed in a stationary mixer, the drum or agitator shall rotate during transportation and until discharge at the agitating speed.
- (14) Truck mixers shall be equipped with an approved revolution counter. Unless equipped to control and count revolutions at mixing speed, mixing shall be done at the batching plant or job site with the mixer operated at agitating speed while in transit.
- (15) For truck mixers operating from plants erected for the sole purpose of supplying concrete to highway projects, and when the delivery time is short enough so that the maximum number of revolutions at mixing speed cannot be exceeded in transit, the mixer may be operated at mixing speed in transit.
- (16) When a stationary mixer is used for partial mixing of the concrete, the mixing time in the stationary mixer may be reduced to the minimum required to intermingle the ingredients, about 30 seconds.
- (17) When a truck mixer is used to finish the partial mixing done in a stationary mixer, the contractor shall mix each batch for 50 or more revolutions at the manufacturer designated mixing speed. No batch shall have more than 300 total revolutions, the sum of the revolutions at mixing and agitating speeds.

501.11 Placing

Replace the entire text with the following:

- (1) Except as allowed in 501.8.2 for Ready-Mixed Concrete, the contractor shall place concrete within 30 minutes after the water is first added to the batch. The contractor shall use placement techniques that minimize segregation. The contractor shall batch, mix, place, and finish concrete for a monolithic unit as continuously as possible.
- (2) For concrete used in structures, except when used in seals, the contractor shall maintain the temperature of the fresh concrete at or below 80 F (27 C) during placement.

501.12.3.1 General

Replace the entire text with the following:

- (1) Unless otherwise directed by the engineer, the contractor shall protect all concrete masonry mixed or placed under one or more of the following conditions:
 1. Mixing or placement occurs from December 1 through March 31 inclusive.
 2. The air temperature is 40 F (5 C) or less.
 3. The air temperature is predicted to be 40 F (5 C) or less within six days following placement.
- (2) The contractor shall protect all concrete for structural masonry from freezing until it has reached a compressive strength of 3500 psi (24 MPa). The contractor shall determine compressive strength by one or both of the following methods:
 1. Compressive strength testing of field cured cylinders.
 2. Maturity of the in place concrete, as prescribed in ASTM C1074, using the temperature-time factor method with a 32F (0 C) datum temperature.

501.12.3.2 Mixing

Replace paragraph one with the following:

- (1) The contractor shall heat the mixing water, aggregates, or both under one or both of the following conditions:
 1. The air temperature is 40 F (5 C) or less at the time of mixing or placement.
 2. The air temperature is predicted to be 40 F (5 C) or less within 24 hours following placement.
-

502.2.3 Liquid Membrane-Forming Compounds

Replace the entire text with the following:

- (1) For curing concrete in structures, the contractor shall provide liquid curing compound conforming to AASHTO M 148, Type 1-D, Clear or Translucent with Fugitive Dye, except as modified for testing in 415.2.5.1.
-

502.3.2 Composition of Concrete

Replace paragraph four with the following:

- (4) The contractor shall provide the Grade of concrete prescribed in 501.4.3.3.
-

502.3.5.2 Falsework

Replace paragraph four and the "Grade of Concrete" table with the following:

- (4) When field operations are not controlled by cylinder tests, the contractor shall maintain in-place, falsework supporting concrete masonry in bridges, including slabs, beams, girders, arches, or concrete slabs on steel or concrete girders. The contractor may remove that falsework after the following minimum times:

<u>Span Length</u>	<u>Grade of Concrete</u>	
	A, A-FA, A-S, A-IP, A-IS, or D	A-H.E.S, C, C-FA, C-S, C-IP, or C-IS
12 feet (3.66 m) or Less	7	3
Over 12 feet (3.66 m)	14	6

* Only count days where the concrete surface temperature did not fall below 40 F (4 C).

502.3.6.1 General

Replace paragraph ten with the following two paragraphs:

- (10) Where concrete is conveyed or placed by pumping, the equipment shall be suitable in kind and adequate in capacity for the work. The equipment shall be so arranged that no vibrations result which might damage freshly placed concrete. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned.
- (10-a) When concrete is placed by pumping, the contractor shall take action to minimize entrained air loss. The point of discharge from the flexible hose at the end of the boom shall be higher than the lowest point of the flexible hose. When the boom is extended, this may be accomplished by laying part of the flexible hose on the deck. When the flexible hose is completely suspended from the boom, this shall be accomplished by tying the discharge end of the flexible hose back toward the end of the rigid boom to form a partial loop. Alternate methods may be approved by the engineer if the contractor can demonstrate that the air loss in the concrete imparted by the pumping process does not exceed 1.0 percent in any boom orientation.

502.3.6.3 Depositing Concrete Underwater

Replace paragraph two with the following:

- (2) The contractor shall provide Grade D concrete as prescribed for concrete masonry in 501 except that the slump shall be 5 to 9 inches (125 to 225 mm). For concrete used in seals, the contractor may use up to 40 gallons per cubic yard (200 L/m³) of mixing water.

502.3.9 Curing

Replace paragraphs fifteen and sixteen with the following:

- (15) Concrete Masonry in the inside faces of railings and parapets shall be cured by covering with wetted burlap immediately after the forms are removed and the required surface finish is applied and keeping such covering thoroughly wet for a period of at least four days; or by covering for a like period with thoroughly wetted polyethylene-coated burlap meeting the requirements of 415.2.5.5. Coverings shall be satisfactorily secured along all edges to prevent loss of moisture.
- (16) Concrete Masonry in the outside faces of railings, parapets, exterior girders and similar parts of the structure shall be cured by applying membrane curing material immediately after the forms are removed and the required surface finish is applied; or by covering with wetted burlap immediately after the forms are removed and the required surface finish is applied and keeping such covering thoroughly wet for a period of at least four days; or by covering for a like period with thoroughly wetted polyethylene-coated burlap meeting the requirements of 415.2.5.5. Coverings shall be satisfactorily secured along all edges to prevent loss of moisture.

502.3.11.2 Superstructures

Replace the entire text with the following:

- (1) When approved by the engineer, the contractor may store small articles or operate necessary light equipment on concrete decks that have cured sufficiently to prevent damage to the concrete. When the in-place strength is determined by testing cylinders, the contractor may operate loaded trucks or heavy equipment on the superstructure after the affected concrete attains a compressive strength of 3500 psi (24.2 MPa). In the absence of cylinder test information, the contractor shall not operate loaded trucks or heavy equipment on the superstructure until the affected concrete has cured, under favorable conditions, for at least 21 days. When Grade A-FA, A-S, A-IS, or A-IP concrete is used, that period will be extended to 28 days.
- (2) The contractor shall determine the attained strength of the concrete as the average of compressive strength test results for two cylinders. When the strength of a cylinder is less than 90 percent of the required strength, the engineer will reject the resulting average. The contractor shall field cure cylinders under conditions similar to the most unfavorable conditions prevailing in the portion of the structure they represent.
- (3) On structures where the deck concrete conforms to the requirements of the preceding two paragraphs; the contractor may operate hauling equipment, as necessary to perform subsequent pours, on the structure after curbs or parapets have been in place for 24 hours. For the first 24 hours the contractor shall limit loadings applied directly over the exterior girders to those imposed during concrete unloading operations.

502.3.12 Name Plates

Replace paragraph three with the following:

- (3) Each plate shall be rigidly attached to concrete structures by means of two lugs at least 75 mm long cast integral with the plate. The plate lugs shall be imbedded or epoxied in the concrete with the outer face of the border flush with the face of the concrete.

502.5.1 Description

Replace paragraph two with the following:

- (2) Concrete Masonry Anchors, Type L shall consist of drilling holes and furnishing and placing epoxy resin cartridges, and placing reinforcing bar anchors of the length and bar size shown on the plan.

502.7.6 Protective Surface Treatment

Replace the entire text with the following:

- (1) Protective surface treatment will be measured in square meters. The quantity measured for payment shall be the actual area of bridge deck and appurtenances treated in accordance with the contract.

502.8.6 Protective Surface Treatment

Replace the entire text with the following:

- (1) This item, measured as provided above, will be paid for at the contract unit price per square meter for Protective Surface Treatment. Such payment shall be payment in full for furnishing and applying all materials, for preparing and cleaning all surfaces, and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work in accordance with the contract.

503.3.2.2.1 Steam Curing

Replace paragraph three with the following:

- (3) The temperature within the enclosure during the curing period shall be maintained between 10 C and 71 C. The temperature adjacent to the concrete in different locations within the housing shall not vary more than 12 C at any one time.

Add the following new subsection:

505.2.5 Welded Steel Wire Fabric for Concrete Reinforcement

- (1) Welded steel wire fabric for concrete reinforcement shall conform to AASHTO M 55M. The mass and design of the fabric shall be as shown on the plans.

505.2.6 Dowel Bars and Tie Bars

Replace the entire text with the following:

505.2.6.1 Dowel Bars

- (1) Dowel bars shall be plain, round, smooth, coated bars, free from burrs or other deformations detrimental to free movement of the bar in the concrete; shall have at least one end sawed; and shall be of the size and length shown on the plans. Dowel bars shall conform to AASHTO M 31M, Grade 300 or 400. Bend tests will not be required. The coating shall be a thermosetting epoxy and conform to AASHTO M 254, Type B. The coating applicator must have an Epoxy Coating Plant Certification by the Concrete Reinforcing Steel Institute. A surface treatment capable of preventing bond between the bar and the concrete shall be applied to the epoxy-coated bars. Manufacturer applied treatments meeting the above criteria will be allowed. Field surface treatments shall be applied when the bars are placed in the magazine of a dowel bar inserter or after the dowel assembly has been fastened to the base course.
- (2) Sawed ends, sheared ends, cut ends, ends left bare during the coating process or ends with damaged coating do not have to be coated or patched.
- (3) Damage to the coating on the circumferential surface area caused during shipment, handling or installation does not have to be repaired in cases where the damaged area is 6 by 6 mm or smaller and the sum of all damaged areas in each 300 mm length does not exceed two percent of the circumferential surface area in each 300 mm length. All damaged areas larger than 6 mm square shall be repaired and all bars with total damage greater than two percent of bar circumferential

surface area shall be rejected. The total circumferential surface area of the dowel bar covered by patching material shall not exceed five percent.

505.2.6.2 Tie Bars

505.2.6.2.1 General

- (1) Tie bars shall be deformed, coated, steel reinforcement bars of the size, length and shape called for on the plans.
- (2) Bent tie bars shall meet the requirements of Grade 300 or 400 of AASHTO M 31M.
- (3) Straight tie bars shall conform to Grade 300 or 400 of AASHTO M 31M. Bend tests will not be required.

505.2.6.2.2 Coating

- (1) The coating shall conform to the requirements contained in 505.2.4, except as follows:
- (2) Sawed ends, sheared ends, cut ends, ends left bare during the coating process or ends with damaged coating do not have to be coated or patched.
- (3) Damage to the coating on the circumferential surface area caused during shipment, handling or installation does not have to be repaired in cases where the maximum dimension of the damaged area is 6 mm or less and the sum of all damaged areas in each 300 mm length does not exceed two percent of the circumferential surface area in each 300 mm length. All damaged areas larger than 6 mm shall be repaired and all bars with total damage greater than two percent of bar circumferential surface area shall be rejected. The total circumferential surface area of the tie bar covered by patching material shall not exceed five percent.
- (4) All coated tied bars which require straightening to tie adjacent concrete together shall be field coated with compatible coating material at the bend location after straightening.

505.3.3 Splicing

Add the following to the end as paragraph fifteen:

- (15) Sheets of welded steel wire fabric shall overlap each other sufficiently to maintain a uniform strength and shall be securely fastened at the ends and edges. The edge lap shall be not less than one mesh in width.

505.3.4 Placing and Fastening

Replace paragraph ten with the following:

- (10) Coated bars shall be tied using a procedure, equipment, and materials that will not damage or cut the coating. Ties for use with coated reinforcement shall be an approved plastic or nonmetallic material; stainless steel wire; or nylon, epoxy, or plastic-coated wire.

506.2.6.2. Preformed Fabric, Class A

Replace the entire text with the following:

- (1) This material shall consist of preformed fabric pads composed of multiple layers of 227 g cotton duck impregnated and bound with high-quality natural rubber or of equivalent and equally suitable materials compressed into resilient pads of uniform thickness. The number of plies shall be such as to produce the specified thickness after compression and vulcanizing. The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 69 MPa without detrimental extrusion or reduction in thickness, under testing conducted in accordance with MIL-C-882E procedures.

506.2.6.3. Non-Laminated Elastomeric

Replace paragraph two and the entire table of required physical properties with the following:

- (2) The pads shall conform to the following physical properties:

	<u>Natural Rubber</u>	<u>Chloroprene</u>
Grade (Durometer).....	60	60
Physical Properties		
Hardness (ASTM D 2240)	60±5	60±5
Tensile strength, kPa (ASTM D 412)	15 500	15 500
Ultimate elongation, min. percent	400	350
Heat Resistance, 70 hrs. at 70 C (ASTM D 573)		
Hardness, max. points change	+10	+15
Tensile strength, max. percent change	-25	-15
Ultimate elongation, max. percent change	-25	-40
Compression Set (ASTM D 395, Method B)		
22 hrs. at 70 C max. percent	25	N.A.
22 hrs. at 100 C max. percent	N.A.	35
Ozone (ASTM D 1149), 20 percent strain, 38±1 C, mounting procedure ASTM D 518, Method A		
25 pphm ozone in air by volume, 48 hrs.....	No cracks	N.A.
100 pphm ozone in air by volume, 100 hrs.	N.A.	No cracks

506.2.6.4.3 Testing

Replace paragraph two with the following:

- (2) The pads shall conform to the following physical properties:

	<u>Natural Rubber</u>	<u>Chloroprene</u>
Adhesion Test:		
Bond made during vulcanization, (ASTM D 429, Method B).....	18 kg/25 mm	18 kg/25 mm
Low Temperature Test:		
Brittleness at -40 C, (ASTM D746, Procedure B).....	No Failure	No Failure

507.2.2.6.1 General

Replace paragraph three with the following:

- (3) Unless otherwise specifically provided in the contract, the preservative treatment of structural lumber and timber shall be with one of the following: creosote- coal tar solution, a pentachlorophenol solution in petroleum solvent, a chromated copper arsenate solution, an ammoniacal copper arsenate solution, an ammoniacal copper zinc arsenate solution, a copper naphthenate solution, or an ammoniacal copper quat solution, except that Coastal Douglas Fir shall not be treated with chromated copper arsenate or ammoniacal copper quat, and Hem-Fir shall not be treated with copper naphthenate.

Add the following to the end as paragraph eleven:

- (11) The ammoniacal copper quat solution shall conform to the requirements specified under 507.2.3.8.

Add the following new subsection.

507.2.3.8 Ammoniacal Copper Quat

- (1) Ammoniacal copper quat solution used in the preservative treatment of lumber and timber shall conform to Type D, as specified in AWWA P5.

508.5.3 Timber Piling, Delivered

Replace paragraph two with the following:

- (2) The Department will pay for preparing and pointing of salvaged pile cutoffs, designated by the engineer to be used for piling, at a price per piling prepared and pointed. This price will be determined by multiplying the contract unit price for Timber Piling, Delivered, Treated or Untreated, as the case may be, by five for US Standard Measure projects (two for SI Metric projects). This price shall be payment in full for furnishing all labor, tools, equipment and incidentals necessary to prepare the salvaged pile cutoff for driving.

509.1 Description

Replace paragraph three with the following:

- (3) The items of Preparation, Decks, Type 1; Preparation, Decks, Type 2; and Preparation, Approaches shall consist of the removal of all asphaltic patches and unsound or disintegrated areas of concrete decks and approach pavements as shown on the plans or as directed by the engineer.

509.2 Materials

Replace paragraph four with the following:

- (4) The contractor shall use concrete for Joint Repair, Curb Repair, and Full Depth Deck Repair conforming to Grade C, C-FA, C-S, C-IS, C-IP, D, or E Concrete Masonry as specified in 501; except as follows:
 1. The mix temperature requirement specified in 501.11 shall not apply.
 2. The slump of Grade E concrete may be increased to 3 inches (75 mm).
 3. Ready-Mixed Concrete may be used.

509.4.2 Preparation

Add the following as paragraphs two and three:

- (2) Under the item of Preparation, Decks, Type 1, existing asphaltic patching and unsound bridge deck concrete shall be removed only to that depth which will expose one-half of the peripheral area of the top or bottom bar steel in the top mat of reinforcement.
- (3) Under the item of Preparation, Decks, Type 2, existing unsound bridge deck concrete shall be removed below the limit of the Type 1 removal described above. The minimum depth of Type 2 removal shall be 25 mm below the bottom of the top or bottom bar steel in the top mat of reinforcement. Further removal shall be as directed by the engineer.

509.4.3 Joint Repair

Replace paragraph two with the following:

- (2) The concrete at an existing joint to be replaced shall be removed to the limits shown on the plans, or as directed by the engineer. The bottom edge of the deck shall have a 1/2 inch deep saw cut placed at the line of removal to control concrete breakout or have the line of removal covered by a 1 1/2 inch thick layer of concrete to cover all reinforcing steel exposed during joint repair. The contractor shall use removal equipment that will not cause damage to the portion of the concrete floor, curbs and reinforcing steel that is to remain in place. The contractor shall not use tractor-mounted rams for removal operations within 9 inches (225 mm) of the edge, or within the depth of the slab from the edge, whichever is less.

509.5 Method of Measurement

Replace paragraph two with the following:

- (2) Preparation, Decks, Type 1 will be measured by area in square meters of work done in accordance with requirements for Type 1 bridge deck preparation, completed and accepted. Preparation, Decks, Type 2 will be measured by area in square meters of work done in accordance with requirements for Type 2 bridge deck preparation, completed and accepted. Preparation, Approaches will be measured by area in square meters of work done in accordance with requirements for approach pavement preparation, completed and accepted. Areas of Type 2 removal will not be subtracted from areas of Type 1 removal. Areas of Full Depth Deck Repair directed by the engineer prior to beginning the Type 1 or Type 2 deck removals will be subtracted from the areas of the Type 1 or Type 2 removals. Areas of full depth Deck Repair directed by the engineer after Type 1 or Type 2 deck removals are underway will not be subtracted from the areas of the Type 1 or Type 2 removals. Areas of Joint Repair will not be measured under these items.

509.6.2 Preparation

Replace the entire text with the following:

- (1) The quantity, measured as provided above, will be paid for at the contract unit price per square meter for Preparation, Decks, Type 1, Preparation, Decks, Type 2 or Preparation, Approaches, as the case may be, which price shall be payment in full for removing asphaltic patches and unsound concrete; for disposal of waste materials; and for furnishing all equipment, tools, labor and incidentals necessary to complete the work in accordance with the contract.

509.6.6 Full Depth Deck Repair

Replace paragraph one with the following:

- (1) This item, measured as provided above, will be paid for at the contract unit price per square meter, which price shall be full compensation for the complete removal of the deteriorated concrete areas; for disposal of waste material; for forming; for salvaging and using the existing bar steel reinforcement; and for furnishing all equipment, tools, labor and incidentals necessary to complete work in accordance with the contract. This item will be paid at the contract unit price regardless of whether it is directed by the engineer before or after beginning the Type 1 or Type 2 removals.

510.5.1 Cast In Place Concrete Piling, Delivered and Driven

Replace paragraph two with the following:

- (2) The Department will pay for field splices for necessary extensions to ordered and delivered lengths of piling at the total of one splice per pile; provided the pile, when delivered, was at least the length shown on the plan, and the spliced pile has been driven and accepted. Splices meeting these qualifying conditions will be paid for at a unit price each, determined by multiplying the contract unit price for Cast In Place Concrete Piling, Delivered and Driven, (Size), by six for US Standard Measure projects (two for SI Metric projects). This price shall be payment in full for performing all welding and for furnishing all labor, tools, equipment, welding materials and incidentals, except lengths of piling, necessary to complete each splice.

511.5 Basis of Payment

Replace paragraph two with the following:

- (2) The Department will pay for field splices for necessary extensions to ordered and delivered lengths of piling at the total of one splice per pile; provided the pile, when delivered, was at least the length shown on the plan, and the spliced pile has been driven and accepted. Splices meeting these qualifying conditions will be paid for at a unit price each, determined by multiplying the contract unit price for Steel Piling, Delivered and Driven, (HP Size Mass), by nine for US Standard Measure projects (three for SI Metric projects). This price shall be payment in full for performing all welding and for furnishing all labor, tools, equipment, welding materials and incidentals, except lengths of piling, necessary to complete each splice.

520.3.3 Laying Pipe

Add the following as paragraph four:

- (4) At the contractor's option, sealers meeting the requirements of 607.2.3, 607.2.4, 607.2.5 or 607.2.6 may be used instead of the geotextile fabric joint wrap. Construction methods for sealing the joints with these sealers shall comply with 607.3.4. There shall be no additional compensation to the contractor for using sealers instead of geotextile fabric.

520.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the size specified for Culvert Pipe, (Class), Pipe Cattle Pass, or Temporary Culvert Pipe as the case may be, which price shall be payment in full for furnishing, hauling and placing the pipe, including bands, geotextile joint wrap when required, and joint tie when required; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone headwalls will be paid for in accordance with the provisions of the specifications for the items of work involved.

521.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of corrugated steel pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the size specified for Corrugated Steel Culvert Pipe, Corrugated Steel Pipe Arch or Corrugated Steel Pipe Cattle Pass, as the case may be, which price shall be payment in full for furnishing, hauling and placing the pipe or pipe arch, including bands and concrete walkway for pipe cattle pass; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone masonry headwalls will be paid for in accordance with the provisions of the specifications for the items of work involved.

522.2.2 Reinforced Concrete Pipe

Replace paragraph one with the following:

- (1) The contractor shall provide reinforced concrete pipe for culverts that conforms to AASHTO M 170M, for the class of pipe specified, except for the following requirements. The concrete mixture shall not contain less than 565 lbs of cementitious materials per cubic yard (335 kg/m³). The combination of cementitious materials used in the concrete shall be one of the following:
 - Portland cement only.
 - Portland blast furnace slag cement only.
 - Portland pozzolan cement only.
 - A combination of portland cement and fly ash where the fly ash is between 5 and 25 percent by weight of total cementitious material.
 - A combination of portland cement and ground granulated blast furnace slag where the slag is between 5 and 25 percent by weight of total cementitious material.

522.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of reinforced concrete pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the size specified for Reinforced Concrete Culvert Pipe (Class) or Reinforced Concrete Pipe Cattle Pass, as the case may be, which price shall be payment in full for furnishing, hauling and placing the pipe, including concrete walkway for pipe cattle pass, geotextile joint wrap, and joint ties when required; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone masonry headwalls will be paid for in accordance with the provisions of the specifications for items of work involved.

523.2.2 Reinforced Concrete Horizontal Elliptical Pipe

Replace paragraph one with the following:

- (1) The contractor shall provide reinforced concrete horizontal elliptical pipe for culverts that conforms to AASHTO M 207M, for the class of pipe specified, except for the following requirements. The concrete mixture shall not contain less than 565 lbs of cementitious materials per cubic yard (335 kg/m³). The combination of cementitious materials used in the concrete shall be one of the following:
 - Portland cement only.
 - Portland blast furnace slag cement only.
 - Portland pozzolan cement only.
 - A combination of portland cement and fly ash where the fly ash is between 5 and 25 percent by weight of total cementitious material.
 - A combination of portland cement and ground granulated blast furnace slag where the slag is between 5 and 25 percent by weight of total cementitious material.

523.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of reinforced concrete horizontal elliptical pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the size specified for Reinforced Concrete Horizontal Elliptical Culvert Pipe (Class) which price shall be payment in full for furnishing, hauling and placing the pipe, geotextile joint wrapping, and joint ties when required; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

524.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of salvaged pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the specified size for Salvaged Culvert Pipe, Salvaged Corrugated Steel Pipe Arch or Salvaged Pipe Cattle Pass, as the case may be, which price shall be payment in full for excavating and removing pipe from existing location, cleaning and transporting; for all excavation, including foundation or bed and any associated dewatering; for placing pipe, including the furnishing of any necessary new bands; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; for furnishing and placing geotextile joint wrap when required and joint ties when required and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

525.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of corrugated aluminum pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the size specified for Corrugated Aluminum Culvert Pipe which price shall be payment in full for furnishing, hauling and placing the pipe, including bands; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone masonry headwalls will be paid for in accordance with the provisions of the specifications for the items of work involved.

528.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of polymer coated corrugated steel pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the various sizes specified under the contract for Polymer Coated Corrugated Steel Culvert Pipe or Polymer Coated Corrugated Steel Pipe Arch, as the case may be, which price shall be payment in full for furnishing, hauling and placing the pipe or pipe arch, including bands; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone headwalls will be paid for in accordance with the provisions of the specifications for the items of work involved.

529.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of aluminum coated corrugated steel pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the various sizes of pipe specified under the contract for Aluminum Coated Corrugated Steel Culvert Pipe or Aluminum Coated Corrugated Steel Pipe Arch, as the case may be, which price shall be payment in full for furnishing, hauling and placing the pipe or pipe arch, including bands; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone headwalls will be paid for in accordance with the provisions of the specifications for the items of work involved.

530.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of corrugated polyethylene pipe culverts, measured as provided above, will be paid for at the contract unit price per meter of the various sizes specified under the contract for Corrugated Polyethylene Culvert Pipe, which price shall be payment in full for furnishing, hauling and placing the pipe, including bands; for all excavation, including foundation or bed and any associated dewatering; for furnishing and placing Granular Backfill or graded aggregate for granular foundation or cushion; for backfilling, except as provided below; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work. Concrete or stone headwalls will be paid for in accordance with the provisions of the specifications for the items of work involved.

PART VI INCIDENTAL CONSTRUCTION

601.2 Materials

Replace paragraph two with the following:

- (2) The contractor shall provide concrete masonry that conforms to the requirements for Concrete Masonry, Grade A, A-2, A-FA, A-S, A-S2, A-IS or A-IP as specified in 501.
-

601.4.6 Protection and Curing

Replace paragraph two with the following:

- (2) The contractor shall cure the concrete as prescribed for concrete pavement in 415.5.10.
-

602.2 Materials

Replace paragraph two with the following:

- (2) The contractor shall provide concrete masonry that conforms to the requirements for Concrete Masonry, Grade A, A-2, A-FA, A-S, A-S2, A-IS or A-IP as specified in 501.
-

602.3.1.6 Curing and Protection

Replace the entire text with the following:

- (1) The contractor shall cure the concrete as prescribed for concrete pavement in (2) The contractor shall protect sidewalks as prescribed for concrete pavement in 415.5.14, except that the engineer may allow the contractor to open sidewalks to pedestrian traffic after the concrete has developed sufficient strength to prevent damage to the surface.
-

603.1 Description

Replace paragraphs six through nine with the following:

- (6) Temporary Precast Concrete Barrier, Contractor Furnished and Delivered, shall consist of the contractor furnishing, delivering to the worksite(s) within the project, and removing precast reinforced concrete barrier conforming to the shape, dimensions and details shown on the plans.
 - (7) Temporary Precast Concrete Barrier, State Owned, Contractor Delivered shall consist of the contractor loading the state owned precast reinforced concrete barrier at the designated site, delivering it to the worksite(s) within the project, and removing and returning it to the designated site.
 - (8) Temporary Precast Concrete Barrier, Contractor Furnished, Contractor Installed shall consist of the contractor installing, and subsequently moving and reinstalling, precast reinforced concrete barrier furnished by the contractor. Subsequent moving and reinstalling shall be as identified in the contract or as directed by the engineer.
 - (9) Temporary Precast Concrete Barrier, State Owned, Contractor Installed shall consist of the contractor installing, and subsequently moving and reinstalling, state owned precast reinforced concrete barrier. Subsequent moving and reinstalling shall be as identified in the contract or as directed by the engineer.
-

603.2 Materials

Replace paragraph two with the following:

- (2) The contractor shall provide concrete masonry that conforms to the requirements for Concrete Masonry, Grade A, A-2, A-FA, A-S, A-S2, A-IS or A-IP as specified in 501.

603.3.3.2 Contractor Furnished and Delivered

Replace paragraph one with the following:

- (1) The contractor shall furnish and deliver the temporary precast barrier to the project worksite(s) and remove it from the project upon completion of the work. The contractor shall deliver the temporary precast barrier to a project worksite in one of the following ways:
 1. Deliver the temporary precast barrier from outside the project.
 2. Load the temporary precast barrier onto a truck from a different worksite within the project, haul it, and unload it.

603.3.3.4 State Owned, Contractor Delivered

Replace the entire text with the following:

- (1) The contractor shall deliver the state owned temporary precast barrier to the project worksite(s) and remove it from the project upon completion of the work. The contractor shall deliver the state owned temporary precast barrier to a project worksite in one of the following ways:
 1. Deliver the state owned temporary precast barrier from the state stockpile site.
 2. Load the state owned temporary precast barrier onto a truck from a different worksite within the project, haul it, and unload it.
- (2) The contractor shall provide connecting pins to connect barrier sections together. The pins shall remain the property of the contractor after completion of the work.
- (3) The contractor shall replace missing or damaged reflective delineators with approved reflective delineators at maximum intervals of 25 feet (7.6 m) on the vertical face of the barrier exposed to traffic.
- (4) Upon completion of the work, the contractor shall return the state owned precast temporary barrier to the original state stockpile site or to a location designated in the special provisions.

603.4 Method of Measurement

Replace paragraphs two and three with the following:

- (2) The Department will measure Temporary Precast Concrete Barrier, Contractor Furnished and Delivered or Temporary Precast Concrete Barrier, State Owned, Contractor Delivered, as applicable to the contract, once for each worksite within the project. These items will not be measured unless delivery includes a truck haul.
- (3) The Department will measure Temporary Precast Concrete Barrier, Contractor Furnished, Contractor Installed and Temporary Precast Concrete Barrier, State Owned, Contractor Installed, completed and accepted in accordance with the contract, by lineal feet (meters) in-place along the base of the barrier for each initial installation and for each re-installation identified in the contract or directed by the engineer.

603.5.2 Temporary Barrier

Replace the entire text with the following:

- (1) The Department will pay for Temporary Precast Concrete Barrier, Contractor Furnished and Delivered, measured as provided above, at the contract unit price. That price shall be payment in full for furnishing acceptable concrete barrier including reflectors; for delivery; for removal after completion of the work; and for all labor, tools, equipment, materials and incidentals necessary to complete the work, including disposal.
- (2) The Department will pay for Temporary Precast Concrete Barrier, State Owned, Contractor Delivered, measured as provided above, at the contract unit price. That price shall be payment in full for pickup, hauling and, delivery; for furnishing connecting pins; for furnishing and installing necessary reflectors; for removal and return to original pickup site or another designated location

after completion of the work; and for all labor, tools, equipment, materials and incidentals necessary to complete the work.

- (3) The Department will pay for Temporary Precast Concrete Barrier, Contractor Furnished, Contractor Installed, measured as provided above, at the contract unit price. That price shall be payment in full for installing acceptable concrete barrier; and for all labor, tools, equipment and incidentals necessary to complete the work.
- (4) The Department will pay for Temporary Precast Concrete Barrier, State Owned, Contractor Installed, measured as provided above, at the contract unit price. That price shall be payment in full for installing acceptable concrete barrier; and for all labor, tools, equipment and incidentals necessary to complete the work.

604.3.3.1 General

Replace paragraph two with the following:

- (2) The contractor shall cure concrete slope paving as prescribed for concrete pavement in 415.5.10. If the impervious coating method is used, the contractor shall provide clear or translucent membrane curing material as prescribed in 502.2.3 for curing concrete in structures. During cold weather, the contractor shall protect the concrete as prescribed in 415.5.13 for concrete pavement.

606.3.4 Grouted Riprap

Replace paragraph two with the following:

- (2) The contractor shall place grout from the bottom to the top and the sweep the surface with a stiff broom. After grouting is completed, the contractor shall cure the surface as prescribed for concrete pavement in 415.5.10. If the impervious coating method is used, the contractor shall provide clear or translucent membrane curing material as prescribed in 502.2.3 for curing concrete in structures. During cold weather, the contractor shall protect the concrete as prescribed in 415.5.13 for concrete pavement.

608.2 Materials

Replace paragraph two with the following:

- (2) The contractor shall provide reinforced concrete pipe intended for storm sewers that conforms to AASHTO M 170M, for the class of pipe specified, except for the following requirements. The concrete mixture shall not contain less than 565 lbs of cementitious materials per cubic yard (335 kg/m³). The combination of cementitious materials used in the concrete shall be one of the following:
 - Portland cement only.
 - Portland blast furnace slag cement only.
 - Portland pozzolan cement only.
 - A combination of portland cement and fly ash where the fly ash is between 5 and 25 percent by weight of total cementitious material.
 - A combination of portland cement and ground granulated blast furnace slag where the slag is between 5 and 25 percent by weight of total cementitious material.
- (3) Regardless of the basis of acceptance of the pipe, the placement of reinforcement shall comply in all respects with the provisions of AASHTO M 170M.

610.2 Materials

Replace paragraph two with the following:

- (2) The contractor shall provide reinforced concrete horizontal elliptical pipe for storm sewers that conforms to AASHTO M 207M, for the class of pipe specified, except for the following requirements. The concrete mixture shall not contain less than 565 lbs of cementitious materials per cubic yard (335 kg/m³). The combination of cementitious materials used in the concrete shall be one of the following:
 - Portland cement only.
 - Portland blast furnace slag cement only.
 - Portland pozzolan cement only.
 - A combination of portland cement and fly ash where the fly ash is between 5 and 25 percent by weight of total cementitious material.
 - A combination of portland cement and ground granulated blast furnace slag where the slag is between 5 and 25 percent by weight of total cementitious material.

612.6 Basis of Payment

Replace paragraph one with the following:

- (1) The quantity of pipe underdrain, measured as provided above, will be paid for at the contract unit price per meter of each of the various sizes for Pipe Underdrain (Size); Pipe Underdrain, Unperforated (Size); Pipe Underdrain, Wrapped (Size); Pipe Underdrain, Wrapped and Plowed (Size); or Pipe Underdrain, Drain Tile (Size), as the case may be; which price shall be full compensation for furnishing, transporting, handling and placing all materials, including pipe, geotextile wrapping, connections, fittings, rodent screens and caps or plugs; for all excavation, plowing and recompaction, salvage and placement of upper tillable or agricultural soil suitable for supporting vegetation, disposal of surplus material and restoring the site of the work; for all backfill, except as provided below; and for all labor, tools, equipment and incidentals necessary to complete the work. Open-graded material required for trench backfill in the edgedrain system for concrete pavements will be measured and paid for under the separate bid item of Crushed Aggregate Base Course, Open Graded No. 1 or No. 2.

614.1 Description

Replace paragraph one with the following:

- (1) This work shall consist of the construction of cable guard fence, steel plate beam guard, steel thrie beam structure approach, anchorages, terminal ends, crash cushions including replacement cartridges, impact attenuators and marker posts; the construction and removal of temporary steel plate beam guard and anchorages; the salvaging of guard fence; and the adjusting of steel plate beam guard; all at the locations and in accordance with the design and details indicated on the plans and provided by the contract.

Add the following at the end as paragraphs twenty-two and twenty-three:

- (22) Steel Plate Beam Guard, Slotted Rail Terminal, shall consist of furnishing and installing slotted rail terminal ends for Steel Plate Beam Guard.
- (23) Steel Plate Beam Guard, Energy Absorbing Terminal, shall consist of furnishing and installing energy absorbing terminal ends for Steel Plate Beam Guard.

Add the following new subsection:

614.2.3.1 Energy Absorbing Terminal

- (1) Materials furnished for use in energy absorbing terminals for steel plate beam guard shall conform to the manufacturer's specifications.

Add the following new subsection:

614.3.3.1 Energy Absorbing Terminal

- (1) Energy absorbing terminals for steel plate beam guard shall be installed in accordance with the manufacturer's instructions, the plans and pertinent parts of these specifications.

614.4 Method of Measurement

Replace paragraph two with the following:

- (2) The Department will measure Steel Plate Beam Guard (Class), Temporary Steel Plate Beam Guard, or Adjusting Steel Plate Beam Guard, completed and accepted according to the terms of the contract, in place by the lineal foot (meter) along the face of the rail element, as shown on the details. Steel Plate Beam Median Guard, completed and accepted according to the terms of the contract, will be measured in place by the lineal foot (meter) along the centerline of the completed installation.

Replace paragraph four with the following:

- (4) Marker Posts; Marker Posts for Right of Way; Anchorages for Cable Guard Fence; Anchorages for Steel Plate Beam Guard; Anchorages for Temporary Steel Plate Beam Guard; Anchor Assemblies for Steel Plate Beam Guard; Impact Attenuators; Steel Plate Beam Guard, Slotted Rail Terminal; and Steel Plate Beam Guard, Energy Absorbing Terminal, will each be measured complete in place as units.

614.5 Basis of Payment

Add the following at the end as paragraphs thirteen and fourteen:

- (13) Steel Plate Beam Guard, Slotted Rail Terminal, measured as provided above, will each be paid for at the contract unit price, which price shall be payment in full for furnishing and installing all materials required under this system; for setting and driving of posts; for all excavation, backfilling and disposal of surplus material; and for all labor, tools, equipment and incidentals necessary to complete the work.
- (14) Steel Plate Beam Guard, Energy Absorbing Rail Terminal, measured as provided above, will each be paid for at the contract unit price, which price shall be payment in full for furnishing and installing all materials required under the selected system; for setting and driving of posts; for all excavation, backfilling and disposal of surplus material; and for all labor, tools, equipment and incidentals necessary to complete the work.

620.1 Description

Replace the entire text with the following:

- (1) The item of Concrete Corrugated Median shall consist of the construction of concrete corrugated median including nose section, placed in one course on a prepared foundation, at the locations and in reasonably close conformity with the design, dimensions, lines and grades; all as shown on the plans and provided in the contract.
- (2) The item of Concrete Median Blunt Nose shall consist of construction of a blunt concrete median nose section only, at the locations and to the design shown on the plans.
- (3) The item of Concrete Median Sloped Nose shall consist of construction of a sloped concrete median nose section only, at the locations and to the design shown on the plans.

620.3.2 Placing Concrete

Replace paragraph five with the following:

- (5) The contractor shall cure the concrete as prescribed for concrete pavement in 415.5.10.

620.4 Method of Measurement

Replace the entire text with the following:

- (1) The item of Concrete Corrugated Median will be measured by area in square meters in place, including the nose section, completed and accepted in accordance with the requirements of the plan and contract.
- (2) The items of Concrete Median Blunt Nose and Concrete Median Sloped Nose will be measured by area in square meters in place, completed and accepted in accordance with the requirements of the plan and contract.

620.5 Basis of Payment

Replace the entire text with the following:

- (1) The quantity of concrete corrugated median including nose section, measured as provided above, will be paid for at the contract unit price per square meter for Concrete Corrugated Median, and the quantity of concrete median nose only, measured as provided above, will be paid for at the contract unit price per square meter for Concrete Median Blunt Nose or Concrete Median Sloped Nose, as the case may be; which price shall be payment in full for preparation of foundation, for furnishing all materials, including concrete masonry, joint filler and tie bars; for hauling, placing, consolidating, shaping, finishing, curing and protecting the concrete; for disposal of surplus materials; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work.

621.3.3 Curing and Protecting

Replace the entire text with the following:

- (1) The contractor shall cure cast in place concrete monuments for 72 hours by one of the methods described for concrete pavement in 415.5.10.
- (2) The contractor shall protect placed concrete monuments as prescribed for concrete pavement in 415.5.14.
- (3) The contractor shall protect cast in place concrete monuments from freezing for seven days.

622.1 Description

Replace paragraph three with the following:

- (3) Asphaltic Shoulder Rumble Strip shall consist of the construction of milled asphaltic rumble strips on asphaltic concrete pavement shoulders.

622.3 Equipment

Replace the entire text with the following:

- (1) For constructing asphaltic shoulder rumble strips, the contractor shall use a rotary head milling machine with a cutting tip pattern that will produce a relatively smooth cut of the size, shape, spacing, and smoothness shown in the plan details. The cutting heads shall be on a suspension independent from that of the power unit to allow the heads to self-align with slopes and irregularities in the shoulder surface. The machine shall have a guidance system that provides consistent alignment of the rumble strips as shown on the plan.

622.4.2 Asphaltic Shoulder Rumble Strip

Replace the entire text with the following:

- (1) Prior to beginning the work, the contractor shall demonstrate to the engineer the ability to achieve the desired surface inside each depression without tearing or snagging the asphalt. The contractor shall place rumble strips according to the pattern and shape shown in the plan details. The contractor shall not install rumble strips prior to completion of the shoulder being used for live traffic.
- (2) The contractor shall remove milling debris by sweeping or vacuuming prior to opening adjacent lanes to traffic. The contractor shall dispose of wasted material as prescribed in 204.2.3.
- (3) At the end of each working day, the contractor shall remove all equipment and material to a location outside of the clear zone where it does not present a hazard to traffic; and clean the traveled way pavement and shoulder areas by sweeping or vacuuming.

622.5.2 Asphaltic Shoulder Rumble Strip

Replace the entire text with the following:

- (1) The Department will measure Asphaltic Shoulder Rumble Strip by the lineal foot (meter) along each side of the traveled way, from the center of the first groove in a segment to the center of the last groove in that segment, for areas of completed and accepted work.

622.6.2 Asphaltic Shoulder Rumble Strip

Replace the entire text with the following:

- (1) The Department will pay for Asphaltic Shoulder Rumble Strip, measured as provided above, at the contract unit price. That price shall be full compensation for milling, sweeping or vacuuming, disposing of all waste materials; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

625.3.2 Processing Topsoil or Salvaged Topsoil

Replace the entire text with the following:

- (1) All areas from which topsoil is procured shall be cleared, if necessary, by means of mowing weeds or other vegetation to a height of approximately 150 mm, and freed from any litter such as brush, rock or foreign material of objectionable size or quantity.
- (2) The humus-bearing soil shall then be stripped off taking care to avoid incorporation of any underlying sterile soil. The topsoil may then be stockpiled on the right of way or placed directly on the designated areas.
- (3) The item of Salvaged Topsoil shall include the removal of suitable humus bearing topsoil from the sites of the proposed roadway embankments within the limits of the assumed one to one slopes extending outward from the outer limits of the finished shoulders. Suitable topsoil lying within these limits necessary to cover the slopes for the item of Salvaged Topsoil or Topsoil shall be removed. Unstable topsoil lying within these limits, in excess of amounts necessary to cover the slopes, shall be removed as prescribed in 205.3.3 and paid for as Excavation Below Subgrade.
- (4) The removal of topsoil from the site of the proposed roadway lying outside of the assumed one to one slopes in embankment areas shall only be paid for under the item of Salvaged Topsoil or Topsoil if that material is necessary to cover the slopes. Salvaged Topsoil in excess of the contract quantity shall be used to supplant the requirements for contract quantities of Topsoil to be furnished by the contractor from sources outside the right of way. Material excavated in excess of the amounts required to cover the slopes shall be disposed of by the contractor with no additional compensation as described in 205.3.11.

628.2.5.1 Geotextile Fabric

Replace the entire text with the following:

- (1) The geotextile fabric shall consist of either woven or non-woven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride. Non-woven fabric may be needle punched, heat bonded, resin bonded, or combinations thereof. All fabric shall meet the following requirements:

<u>Test Requirement</u>	<u>Method</u>	<u>Value*</u>
Minimum Grab Tensile Strength in the Machine Direction	ASTM D 4632	120 lbs. (550 N)
Minimum Grab Tensile Strength in the Cross Machine Direction	ASTM D 4632	100 lbs. (450 N)
Maximum Apparent Opening Size Equivalent Standard Sieve	ASTM D 4751	No. 30 (600 µm)
Minimum Permittivity	ASTM D 4491	0.05 sec-1
Minimum Ultraviolet Stability Percentage of Strength retained after 500 hours of exposure	ASTM D 4355	70 %

*All numerical values represent minimum/maximum average roll values. (For example, the average of minimum test results on any roll in a lot should meet or exceed the minimum specified values.)

628.3.2 Erosion Mat

Add the following to the end as paragraph eight:

- (8) Type Urban erosion mat shall not be overlapped with Type Urban or other type erosion mat.
-

628.4.5 Silt Fence, Delivered

Replace the entire text with the following:

- (1) Silt Fence, Delivered will be measured by the lineal foot (meter) of acceptable fence delivered to the work and measured for payment in 628.4.6.
-

628.4.6 Silt Fence, Installed

Replace the entire text with the following:

- (1) Silt Fence, Installed completed and accepted, will be measured in place by the lineal foot (meter). Measurement will be along the base of the fence, center to center of end post, for each section of fence.
-

628.5.5 Silt Fence, Delivered

Replace the entire text with the following:

- (1) The Department will pay for Silt Fence, Delivered, measured as provided above, at the contract unit price. That price shall be full compensation for furnishing and delivering acceptable silt fence for the work, including all miscellaneous materials; for protection and storage on the project; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work in accordance with the contract.
-

628.5.6 Silt Fence, Installed

Replace the entire text with the following:

- (1) The Department will pay for Silt Fence, Installed, measured as provided above, at the contract unit price. That price shall be payment in full for erecting fence, including all excavation, placing of posts, backfilling, and attaching geotextile fabric; for removing the fence at completion of the project; and for furnishing all labor, tools, equipment and incidentals necessary to complete the work in accordance with the contract.

630.2.1.5.1.1.1 Composition

Revise the entry for Salt Grass in the first table of paragraph two as follows:

<u>Species Common Name</u>	<u>Species Botanical Name</u>	<u>Acceptable Varieties</u>
Salt Grass.....	Puccinella distans.....	Fult's
	Puccinella distans.....	Salty

636.1 Description

Replace the entire text with the following:

- (1) This item of work shall consist of the construction of concrete masonry footings intended for supporting structural steel sign supports or sign bridges, in conformity with the requirements of the plans and specifications. Structural steel sign supports and sign bridges are described in Section 641.
-

637.2.2.2 Type H Reflective Sheeting

Replace paragraph one with the following:

- (1) Type H reflective sheeting shall comply with the following specification and requirements:

Specification: ASTM D 4956-93b.

Type: III

Class: 1

Reflectivity: 2

Durability: 2200 hours (except orange and reboundable sheeting)
500 hours (orange and reboundable sheeting)

Color: As specified in ASTM D 4956-93b

641.1 Description

Replace the entire text with the following:

- (1) This work shall consist of furnishing and erecting sign bridges and sign supports fabricated from aluminum or structural steel, or combination thereof, consisting of trusses, crossarms, columns, braces, walkway supports, walkway, grating, handrails, guard chains, poles, mast arms, anchor bolts and all incidentals and accessories necessary to complete the work in accordance with the requirements of the plans and specifications. The furnishing and placing of signs or lighting of signs, or placing of concrete supports, except as provided hereinafter for Overhead Sign Support, Structure____, will not be a part of this work.
- (2) Sign Bridge, Single Pole Sign Support, One Sign, Structure____ shall consist of furnishing and erecting single pole sign supports with attachments for signs facing in one direction.
- (3) Sign Bridge, Single Pole Sign Support, Two Signs, Structure____ shall consist of furnishing and erecting single pole sign supports with attachments for signs facing in opposite directions.
- (4) Sign Bridge, Cantilevered, Structure____ shall consist of furnishing and erecting cantilevered sign bridges with a single supporting structure.
- (5) Sign Bridge, Structure Mounted, Structure____ shall consist of furnishing and erecting sign bridges mounted on overhead roadway bridges.
- (6) Sign Bridge, Structure____ shall consist of furnishing and erecting sign bridges with multiple supporting structures.
- (7) Overhead Sign Support, Structure____ shall consist of furnishing and erecting commercially designed sign supports, fabricated from aluminum or steel, consisting of pole shafts, mast arms, anchor bolts, hardware, concrete supports and all other items necessary to complete the work in accordance with the requirements of the plan layout details and the contract.

641.4 Method of Measurement

Replace the entire text with the following:

- (1) The following items will be measured in place as a unit for each specific sign bridge completed and accepted in accordance with the contract:
 - Sign Bridge, Single Pole Sign Support, One Sign, Structure _____
 - Sign Bridge, Single Pole Sign Support, Two Signs, Structure _____
 - Sign Bridge, Cantilevered, Structure _____
 - Sign Bridge, Structure Mounted, Structure _____
 - Sign Bridge, Structure _____
- (2) The item of Overhead Sign Support, Structure _____ will be measured in place by the unit for each specific overhead sign support completed and accepted in accordance with the contract.

641.5 Basis of Payment

Replace the entire text with the following:

641.5.1 Sign Bridges and Single Pole Sign Supports

- (1) The following items, measured as provided above, will be paid for at the contract lump sum price for:
 - Sign Bridge, Single Pole Sign Support, One Sign, Structure _____
 - Sign Bridge, Single Pole Sign Support, Two Signs, Structure _____
 - Sign Bridge, Cantilevered, Structure _____
 - Sign Bridge, Structure Mounted, Structure _____
 - Sign Bridge, Structure _____
- (2) This price shall be payment in full for furnishing all materials, including anchor bolts, dampeners when required in the structure plans, but not including concrete supports paid for separately as described in Section 636; for fabricating, including all cutting, preparing, welding and zinc coating; for transporting and erecting; and for furnishing all labor, tools, equipment and incidentals necessary to complete this item of work in accordance with the contract.

641.5.2 Overhead Sign Supports

- (1) Overhead Sign Support, Structure _____, measured as provided above, will be paid for at the contract lump sum price, which price shall be payment in full for designing the sign support structure including required concrete supports; for excavating; for furnishing all materials, including anchor bolts, pole shafts, mast arms, required reinforcing steel, and concrete; for fabricating, including all cutting, preparing, welding, and zinc coating; for placing and curing concrete supports; for transporting and erecting; and for furnishing all labor, tools, equipment, and incidentals necessary to complete this item of work in accordance with the contract.

642.2.1 General

Add the following to the end as paragraphs three and four:

- (3) A first aid kit shall be supplied by the contractor in each field office and field laboratory provided under the contract. The kits shall be readily accessible to project personnel. The contents of each kit shall be checked at least once each week and expended items shall be replenished. Each kit shall contain, at a minimum, a supply of latex or nitrile gloves, CPR masks, adhesive tape, pressure and cling bandages, antiseptic wipes, bite/sting swabs, cold packs, and safety goggles.
- (4) In situations where the eyes or body of a worker may be exposed to corrosive or potentially harmful materials, the contractor shall provide emergency use facilities capable of flushing the eyes or drenching the body of an exposed worker with water for 15 minutes.

643.1 Description

Replace paragraph one with the following:

- (1) This work shall consist of furnishing, erecting, maintaining, moving and removing traffic signs, including demountable legend plaques, pavement markings, drums, barricades, flexible tubular markers, arrow boards, lights and signals. This work shall be done in accordance with the latest revision of Part VI, Traffic Controls for Construction and Maintenance Operations of the Wisconsin Manual on Uniform Traffic Control Devices except as noted hereafter, the contract, and as directed by the engineer. Sign sizes smaller than the standard sizes described in the manual shall not be used except where there are space limitations and as permitted in the manual.

643.2.1 General

Replace the entire text with the following:

- (1) Materials used in the work shall conform to the requirements specified in the Manual on Uniform Traffic Control Devices and the following:
- (2) Retroreflective sheeting on drums, barricades and other devices shall be kept clean. Scratches, rips and tears in the sheeting shall be corrected promptly by the contractor.
- (3) The retroreflectance of all drums, posts and barricades shall be maintained at a level not less than 50 percent of the minimum value required in 637.2.2.2 for Type H reflective sheeting.

643.2.2.1 General

Replace paragraph one with the following:

- (1) Arrow boards shall conform to the requirements for Arrow Display, 6F-3, Figure VI-9, Type C, of the MUTCD, unless otherwise specified.

643.2.4 Drums

Replace the entire text with the following:

- (1) The contractor shall provide drums for traffic control made of nonmetallic material and fabricated to accept a Type C or Type A light. When required by the contract, each drum shall be equipped with a Type C Steady Burn or Type A Low Intensity Flashing Warning Light securely attached to the drum. Each drum shall be weighted sufficiently with sand bags or other approved material to keep the drum in its intended location. Two piece drums shall not be fastened together or otherwise altered to perform in a way not intended by the manufacturer. Drums for traffic control shall meet the crashworthiness criteria of NCHRP Report 350, Test Level 3. Upon request of the engineer, the contractor shall furnish a letter from the drum manufacturer or distributor which certifies that the drums meet the NCHRP 350 crashworthy requirements.
- (2) The material used for reflectorization shall conform to or exceed the requirements of Subsection 637.2.2.2, and shall be suitable for use on reboundable traffic control devices. The material shall have had acceptable performance (good evaluation ratings) in 1-year tests in AASHTO's National Transportation Product Evaluation Program (NTPEP), with regard to shrinkage, cracking, blistering, colorfastness, reflectivity, adhesion, flexibility, and impact resistance.

643.2.5 Barricades

Replace the entire text with the following:

- (1) The reflective sheeting for all barricades shall conform to or exceed the requirements of 637.2.2.2, designed specifically for use on rigid traffic control devices. The sheeting shall have had good performance in 1-year tests in AASHTO's National Transportation Product Evaluation Program (NTPEP), with regard to shrinkage, cracking, blistering, colorfastness, reflectivity, adhesion, and impact resistance.

643.2.6.1 Flexible Tubular Marker Posts

Replace paragraphs two and three with the following:

- (2) Flexible tubular marker posts shall be made with materials resistant to extreme temperature changes in the range of -29 C to 71 C, ultraviolet light, ozone, hydrocarbons, stiffening with age, and a series of direct wheel impacts with speeds varying up to 105 km/h, and having the capability of immediately restoring itself to a vertical position when struck by a standard vehicle. Flexible tubular marker posts shall be selected from an approved products list maintained by the Department. A current list of approved products may be obtained from the Technology Advancement Unit of the Bureau of Highway Construction. The posts shall meet the crashworthiness criteria of NCHRP Report 350, Test Level 3. Upon request of the engineer, the contractor shall furnish a letter from the post manufacturer or distributor which certifies that the posts meet the NCHRP 350 crashworthy requirements. The posts shall exhibit good quality and shall be free of burns, discoloration, contamination and other objectionable marks or defects which affect appearance or serviceability.
- (3) The reflective sheeting for the flexible tubular marker posts shall meet or exceed the requirements of Subsection 637.2.2.2 and shall be suitable for use on reboundable traffic control devices. The sheeting shall have had acceptable performance (good evaluation ratings) in 1-year tests in AASHTO's National Transportation Product Evaluation Program (NTPEP), with regard to shrinkage, cracking, blistering, colorfastness, reflectivity, adhesion, flexibility, and impact resistance.

643.2.6.3 Tests

Delete the entire text and replace the subsection heading with the following:

643.2.6.3 (Vacant)

643.2.7 Hand Signaling Devices

Replace the entire text with the following:

- (1) The sign paddle shall be the primary hand-signaling device. Flag use shall be limited to emergency situations. The sign paddle shall be mounted on a rigid handle with a 1520 mm minimum mounting height to the bottom of the sign.

643.2.8.1 General

Add the following at the end as paragraphs four and five:

- (4) The sign face material for overlays shall match the base sign reflective sheeting material.
- (5) Non-word messages cannot be a sign overlay, except for the Lane Reduction Transition sign, WO4-2.

643.2.8.2 Demountable Plaque Overlay

Replace paragraph two with the following:

- (2) The sign face material for the plaque shall be reflective sheeting meeting the requirements of Subsections 637.2.2.1 or 643.2.12.

643.2.8.3 Sheeting Overlay

Replace the entire text with the following:

- (1) The sheeting overlay shall be a pressure-sensitive sheeting meeting the requirements of Subsection 637.2.2.1 or 643.2.12.

Add the following new subsection:

643.2.12 Signs

643.2.12.1 General

- (1) Sign layouts shall be in accordance with the FHWA's Manual of Standard Highway Signs, unless otherwise provided on the plans.
- (2) The contractor shall use the materials and methods specified in 637 for Type II Signs to manufacture and assemble signs, with the following modifications:
 - 1. A good exterior Grade A-B plywood with a 13 mm minimum thickness will be acceptable as a sign base.
 - 2. Signs with fluorescent orange prismatic sheeting shall also meet the requirements of 643.2.12.2.
 - 3. Orange work zone traffic control signs mounted on portable sign supports may be fluorescent retroreflective roll-up signs as further specified in 643.2.12.2.
- (3) Standard construction signs shall have all messages and borders stenciled directly on the sign background, except as provided in Subsection 643.2.8 for sign overlays.
- (4) The sign face material for signs R1-1 (STOP), R1-2 (YIELD), R5-1 (DO NOT ENTER), and R5-1a (or R5-9) (WRONG WAY) shall conform to Subsection 637.2.2.2. All other sign face material shall conform to Subsection 637.2.2.1, except as provided in the contract or except as specified hereinafter for orange work zone traffic control signs.
- (5) Retroreflective sheeting on signs shall be kept clean. Scratches, rips and tears in the sheeting shall be corrected promptly by the contractor. Signs with abrasions, asphalt splatter, or concrete slurry on the sign face such that the message or any letters are illegible, shall be corrected or replaced. Signs with noticeable color fading shall be replaced.
- (6) The retroreflectance of all signs, except orange work zone traffic control signs, shall be maintained at a level not less than 75 percent of the minimum value required in Subsection 637.2.2.1 for signs with Standard Reflective Sheeting and not less than 50 percent of the minimum value required in Subsection 637.2.2.2 for signs with Type H Reflective Sheeting.

643.2.12.2 Orange Work Zone Traffic Control Signs

- (1) The sign face material for orange work zone traffic control signs shall be fluorescent orange prismatic retroreflective sheeting having an initial coefficient of retroreflection of not less than 100 cd/1x/m² at a 0.2 degree observation angle and a - 4 degree entrance angle, and 64 cd/1x/m² at a 0.5 degree observation angle and a - 4 degree entrance angle. The sheeting color shall comply with the following chromaticity coordinates and luminance factor:

<u>Luminance</u>										
<u>1</u>		<u>2</u>		<u>3</u>		<u>4</u>		Factor (Y%)		
X	Y	X	Y	X	Y	X	Y	Min.	Max.	
0.583	0.416	0.523	0.397	0.560	0.360	0.631	0.369	28	---	

- (2) The sheeting color and initial Coefficient of Retroreflection shall be verified by independent testing as required by the Department.
- (3) The following work zone traffic control signs do not need to have fluorescent orange prismatic sheeting; materials meeting the requirements of Subsection 637.2.2.1 may be used:
 - 1. G20-2a "End Road Work" signs.
 - 2. M4-9/M4-8 series "Detour" signs, and MO5-x/MO6-x arrow plaques used in detour sign assemblies.
 - 3. Special fixed message signs as specified in Subsection 643.2.11 of the Standard Specifications.
 - 4. Orange plaques which supplement or cover a portion of existing green guide signs.
- (4) Fluorescent orange prismatic sheeting shall be applied to new plywood bases, new aluminum bases, or reconditioned aluminum bases which have had all previous sheeting materials removed.

Existing signs with prismatic sheeting shall not have their messages removed and new messages reapplied to the sign face except as specified for overlays in 643.2.8. Signs mounted on portable sign supports may be fluorescent retroreflective roll-up signs which meet or exceed the Coefficient of Retroreflection requirements of this subsection. Portable sign supports used with fluorescent retroreflective roll-up signs shall comply with the crashworthiness criteria of NCHRP Report 350, Test Level 3. Upon request of the engineer, the contractor shall provide written certification from the sign support distributor or manufacturer that the portable sign support was manufactured in accordance with a design accepted by the Federal Highway Administration as meeting the NCHRP 350, Test Level 3 crashworthy requirements.

- (5) The retroreflectance of all signs with fluorescent orange prismatic sheeting shall be maintained at a level not less than 50 cd/ft^2 (50 cd/lx/m^2) at a 0.2 degree observation angle and - 4.0 degree entrance angle, and 32 cd/ft^2 (32 cd/lx/m^2) at a 0.5 degree observation angle and - 4.0 degree entrance angle. The retroreflectance of all other orange signs shall be maintained at a level not less than 75 percent of the minimum value required in 637.2.2.1 for standard reflective sheeting.

643.3.4 Signs

Add the following at the end as paragraph two:

- (2) The height of post-mounted temporary traffic control signs shall be a minimum of 2130 mm from the bottom of the sign to the height of the near edge of pavement or curb, unless otherwise approved by the engineer. The height to the bottom of a secondary sign mounted below another post-mounted sign shall be a minimum of 1820 mm, unless otherwise approved by the engineer.

643.3.5.2 Types A (Low Intensity Flashing) and C (Steady Burn)

Add the following at the end as paragraph twelve:

- (12) Type A lights are not required to be installed on signs with fluorescent or non-fluorescent orange prismatic retroreflective sheeting.

643.3.7 Sign Message Overlays

Replace paragraph three with the following:

- (3) Non-word messages cannot be a sign overlay, except for the Lane Reduction Transition sign, WO4-2.

643.3.12 Fixed Message Signs

Add the following at the end as paragraph two:

- (2) When a fixed message sign is mounted on posts, the height from the bottom of the sign to the height of the near edge of pavement or curb shall be a minimum of 2130 mm, unless otherwise approved by the engineer.

643.5.1 Traffic Control

Replace paragraph one with the following:

- (1) Traffic Control, measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for constructing, assembling, painting, hauling, erecting, re-erecting, maintaining and removing traffic signs, drums, barricades and similar control devices, including arrow boards, unless otherwise provided; for furnishing, placing and maintaining lights and signals, including the fuel or power therefor, unless otherwise provided; for furnishing, applying and removing pavement markings, unless otherwise provided; and for all labor, tools, equipment, services and incidentals necessary to complete the work.

645.2.4 Geotextile Fabric, Type DF (Drainage Filtration)

Replace paragraph one and the associated tables of physical requirements with the following:

- (1) The fabric shall comply with the physical requirements of either Schedule A, Schedule B, or Schedule C in accordance with the requirements of the contract documents.

<u>SCHEDULE A</u>		
<u>Test</u>	<u>Method</u>	<u>Value⁽¹⁾</u>
Grab Tensile Strength, N	ASTM D 4632	500 min.
Puncture Strength, N	ASTM D 4833	175 min.
Apparent Breaking Elongation, %	ASTM D 4632	30 min.
Apparent Opening Size, μm	ASTM D 4751	300 max.
Permittivity, S-1	ASTM D 4491	0.70 min.

<u>SCHEDULE B</u>		
<u>Test</u>	<u>Method</u>	<u>Value⁽¹⁾</u>
Grab Tensile Strength, N	ASTM D 4632	800 min.
Puncture Strength, N	ASTM D 4833	300 min.
Apparent Breaking Elongation, %	ASTM D 4632	30 min.
Apparent Opening Size, μm	ASTM D 4751	300 max.
Permittivity, S-1	ASTM D 4491	1.35 min.

<u>SCHEDULE C</u>		
<u>Test</u>	<u>Method</u>	<u>Value⁽¹⁾</u>
Grab Tensile Strength, N	ASTM D 4632	800 min.
Puncture Strength, N	ASTM D 4833	300 min.
Apparent Breaking Elongation, %	ASTM D 4632	15 min.
Apparent Opening Size, μm	ASTM D 4751	600 max.
Permittivity, S-1	ASTM D 4491	1.00 min.

645.2.6 Geotextile Fabric, Type R (Riprap)

Replace the entire text with the following:

- (1) The fabric shall comply with the following physical properties:

<u>Test</u>	<u>Method</u>	<u>Value⁽¹⁾</u>
Grab Tensile Strength, N	ASTM D 4632	900 min.
Puncture Strength, N	ASTM D 4833	350 min.
Apparent Breaking Elongation, %	ASTM D 4632	15 min.
Apparent Opening Size, μm	ASTM D 4751	600 max.
Permittivity, S-1	ASTM D 4491	0.12 min.

645.2.7 Geotextile Fabric, Type HR (Heavy Riprap)

Replace the entire text with the following:

- (1) The fabric shall comply with the following physical properties:

<u>Test</u>	<u>Method</u>	<u>Value⁽¹⁾</u>
Grab Tensile Strength, N	ASTM D 4632	1350 min.
Puncture Strength, N	ASTM D 4833	450 min.
Apparent Breaking Elongation, %	ASTM D 4632	15 min.
Apparent Opening Size, μm	ASTM D 4751	600 max.
Permittivity, S-1	ASTM D 4491	0.40 min.

646.2.3.1 General

Replace paragraph four with the following:

- (4) The beads shall be essentially free from surface scratching or scarring and have a minimum of 75 percent true spheres.

646.2.4.4.3 Qualification

Replace the entire text with the following:

- (1) The contractor shall provide a material that has demonstrated good performance on Wisconsin D.O.T. projects.
- (2) If the epoxy material has not been used previously on a Wisconsin D.O.T. project or is a "new improved" version of an accepted formula, the manufacturer shall submit to the Bureau of Highway Operations two months before the bid date, the following for the proposed material:
 1. A list of two or more successful installations, in the United States, at least two years old with at least 8 km of line.
 2. A chemical composition report.
 3. The manufacturer's application recommendations.
- (3) The list of locations in (a) shall include the project identification; length of the project; the contracting agency name; and the name, address, and telephone number of a contact person for each project.
- (4) The Bureau of Highway Operations will designate at least 8 km of line on a Wisconsin D.O.T. project for field performance evaluation. The proposed material must meet the Department's minimum retroreflectivity and durability requirements for one year in service. General approval will require further performance evaluation on one additional project

646.4.2 Applying Painted Markings

Add the following to the end as paragraph three:

- (3) The paint shall be applied according to the manufacturer's recommendation for minimum pavement temperature.

647.1 Description

Replace paragraph eleven with the following:

- (11) Pavement Marking, Curb, shall consist of the furnishing and application of reflectorized curb marking of the specified color, configuration and material. The contractor shall mark the vertical face and top of the curb.

649.2.3 Reflectorized Paint

Replace the entire text with the following:

- (1) The paint shall be commercially available solvent-borne or waterborne paint intended for marking traffic lanes on both concrete and asphaltic highways. The paint shall conform to requirements of Subsections 646.2.1 and 646.2.2. Reflectorization of the paint shall be by means of glass beads. The glass beads shall conform to requirements of Subsection 646.2.3. The color of the paint shall be yellow or white, as required on the plans.

649.4 Construction Methods

Add the following to the end as paragraph ten:

- (10) When no passing zone temporary pavement marking is required, the contractor shall be responsible for the referencing of the beginning and end of all existing no-passing zones prior to pavement resurfacing which will cover the pavement markings. The contractor shall be responsible for the accurate re-marking of the required temporary no-passing zones.

651.3 Construction Methods

Replace paragraph eight with the following:

- (8) The electrical connection between the equipment grounding conductor and any equipment grounding electrode shall be made by the exothermic weld method.

658.3.4 Backplates

Replace the entire text with the following:

- (1) The contractor shall furnish and install backplates on all signal faces as shown on the plans.

658.4 Method of Measurement

Replace paragraph one with the following:

- (1) The Department will measure Trombone Arms, Monotube Arms, Traffic Signal Faces, Pedestrian Signal Faces and Pedestrian Push Buttons as units, complete in place and accepted.

658.5 Basis of Payment

Replace paragraphs four and five with the following:

- (4) The Department will pay for Traffic Signal Faces, (Size), (Vertical or Horizontal), as the case may be, measured as provided above, at the contract unit price. That price shall be full compensation for furnishing and installing signal faces including lamps and backplates; and for all labor, tools, equipment and incidentals necessary to complete the work.
- (5) (Vacant)

**SCHEDULE OF BID ITEMS ADDED AND RETIRED
BY THE 1999 SUPPLEMENTAL SPECIFICATIONS**

Bid Items Added - U.S. Standard Measure (EAS Version 3)

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
41101	Asphaltic Surface	Ton
41102	Asphaltic Surface, Patching	Ton
41103	Asphaltic Surface, Detours	Ton
41104	Asphaltic Surface, Safety Islands	Ton
41105	Asphaltic Surface, Driveways and Field Entrances	Ton
41106	Asphaltic Surface, Temporary	Ton
41526	Concrete Pavement, 6 1/2-Inch	S.Y.
41527	Concrete Pavement, 7 1/2-Inch	S.Y.
41528	Concrete Pavement, 8 1/2-Inch	S.Y.
41529	Concrete Pavement, 9 1/2-Inch	S.Y.
41530	Concrete Pavement, 10 1/2-Inch	S.Y.
41531	Concrete Pavement, 11 1/2-Inch	S.Y.
41538	H.E.S. Concrete Pavement, 8 1/2-Inch	S.Y.
41539	H.E.S. Concrete Pavement, 9 1/2-Inch	S.Y.
41540	H.E.S. Concrete Pavement, 10 1/2-Inch	S.Y.
41541	H.E.S. Concrete Pavement, 11 1/2-Inch	S.Y.
50265	Protective Surface Treatment	S.Y.
50903	Preparation, Decks, Type 1	S.Y.
50904	Preparation, Decks, Type 2	S.Y.
62002	Concrete Median Blunt Nose	S.F.
62003	Concrete Median Sloped Nose	S.F.
61150	Manhole Covers, Type J-Special	Each
61172	Inlet Covers, Type HM-GJ	Each
61173	Inlet Covers, Type HM-GJ-S	Each
61434	Steel Plate Beam Guard, Slotted Rail Terminal	Each
61435	Steel Plate Beam Guard, Energy Absorbing Terminal	Each
62815	Silt Fence, Delivered	L.F.
62816	Silt Fence, Installed	L.F.
62826	Erosion Mat, Delivered, Class I, Type Urban	S.Y.
62827	Erosion Mat, Installed, Class I, Type Urban	S.Y.
64101-64105 et seq.	Sign Bridge, Single Pole Sign Support, One Sign, Structure _____	LS
64106-64110 et seq.	Sign Bridge, Single Pole Sign Support, Two Signs, Structure _____	LS
64112-64125 et seq.	Sign Bridge, Cantilevered, Structure _____	LS
64151-64155 et seq.	Sign Bridge, Structure Mounted, Structure _____	LS
64181-64185 et seq.	Overhead Sign Support, Structure _____	LS
65308	Pull Boxes, Steel, 12x30-Inch	Each
65309	Pull Boxes, Steel, 18x30-Inch	Each
65310	Pull Boxes, Steel, 24x42-Inch	Each
65311	Pull Boxes, Steel, 24x48-Inch	Each
65410	Concrete Bases, Type 6	Each

65719	Traffic Signal Standards, Steel, 3.5-Foot	Each
65724	Traffic Signal Standards, Steel, 10-Foot	Each
65729	Traffic Signal Standards, Aluminum, 3.5-Foot	Each
65734	Traffic Signal Standards, Aluminum, 10-Foot	Each

Bid Items Retired - U.S. Standard Measure (EAS Version 3)

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
30421	Asphaltic Pavement, Base Course	C.Y.
30422	Asphaltic Pavement, Base Course	Ton
50230	Protective Surface Treatment	Gal.
50901	Preparation, Decks	S.Y.
62848	Silt Fence, Silty Soil, Delivered	L.F.
62849	Silt Fence, Sandy Soil, Delivered	L.F.
62850	Silt Fence, Silty Soil, Installed	L.F.
62851	Silt Fence, Sandy Soil, Installed	L.F.
64127	Sign Bridges, 20-Ft. Span	Each
64128	Sign Bridges, 25-Ft. Span	Each
64129	Sign Bridges, 30-Ft. Span	Each
64130	Sign Bridges, 35-Ft. Span	Each
64131	Sign Bridges, 40-Ft. Span	Each
64132	Sign Bridges, 45-Ft. Span	Each
64133	Sign Bridges, 50-Ft. Span	Each
64134	Sign Bridges, 55-Ft. Span	Each
64135	Sign Bridges, 60-Ft. Span	Each
64136	Sign Bridges, 65-Ft. Span	Each
64137	Sign Bridges, 70-Ft. Span	Each
64138	Sign Bridges, 75-Ft. Span	Each
64139	Sign Bridges, 80-Ft. Span	Each
64140	Sign Bridges, 85-Ft. Span	Each
64142	Sign Bridges, 90-Ft. Span	Each
64143	Sign Bridges, 95-Ft. Span	Each
64144	Sign Bridges, 100-Ft. Span	Each
64145	Sign Bridges, 105-Ft. Span	Each
64146	Sign Bridges, 110-Ft. Span	Each
64147	Sign Bridges, 115-Ft. Span	Each
64148	Sign Bridges, 120-Ft. Span	Each
64160	Single Pole Sign Supports, One Sign	Each
64165	Single Pole Sign Supports, Two Signs	Each
64180	Overhead Sign Supports	Each
65835	Backplates, 1 Section, 12-Inch Signal Faces	Each
65836	Backplates, 3 Section, 12-Inch Signal Faces	Each
65837	Backplates, 4 Section, 12-Inch Signal Faces	Each
65838	Backplates, 5 Section, 12-Inch Signal Faces	Each
65839	Backplates, 12-8-8 Inch Signal Faces	Each

**SCHEDULE OF BID ITEMS ADDED AND RETIRED
BY THE 1999 SUPPLEMENTAL SPECIFICATIONS**

Bid Items Added - SI Metric (EAS Version 4)

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
41101	Asphaltic Surface	Mg
41102	Asphaltic Surface, Patching	Mg
41103	Asphaltic Surface, Detours	Mg
41104	Asphaltic Surface, Safety Islands	Mg
41105	Asphaltic Surface, Driveways and Field Entrances	Mg
41106	Asphaltic Surface, Temporary	Mg
41526	Concrete Pavement, 165 mm	m ²
41527	Concrete Pavement, 190 mm	m ²
41528	Concrete Pavement, 215 mm	m ²
41529	Concrete Pavement, 240 mm	m ²
41530	Concrete Pavement, 265 mm	m ²
41531	Concrete Pavement, 290 mm	m ²
41538	H.E.S. Concrete Pavement, 215 mm	m ²
41539	H.E.S. Concrete Pavement, 240 mm	m ²
41540	H.E.S. Concrete Pavement, 265 mm	m ²
41541	H.E.S. Concrete Pavement, 290 mm	m ²
50265	Protective Surface Treatment	m ²
50903	Preparation, Decks, Type 1	m ²
50904	Preparation, Decks, Type 2	m ²
62002	Concrete Median Blunt Nose	m ²
62003	Concrete Median Sloped Nose	m ²
61150	Manhole Covers, Type J-Special	Each
61172	Inlet Covers, Type HM-GJ	Each
61173	Inlet Covers, Type HM-GJ-S	Each
61434	Steel Plate Beam Guard, Slotted Rail Terminal	Each
61435	Steel Plate Beam Guard, Energy Absorbing Terminal	Each
62815	Silt Fence, Delivered	m
62816	Silt Fence, Installed	m
62826	Erosion Mat, Delivered, Class I, Type Urban	m ²
62827	Erosion Mat, Installed, Class I, Type Urban	m ²
64101-64105 et seq.	Sign Bridge, Single Pole Sign Support, One Sign, Structure _____	LS
64106-64110 et seq.	Sign Bridge, Single Pole Sign Support, Two Signs, Structure _____	LS
64112-64125 et seq.	Sign Bridge, Cantilevered, Structure _____	LS
64151-64155 et seq.	Sign Bridge, Structure Mounted, Structure _____	LS
64181-64185 et seq.	Overhead Sign Support, Structure _____	LS
65308	Pull Boxes, Steel, 300 x 750 mm	Each
65309	Pull Boxes, Steel, 450 x 750 mm	Each
65310	Pull Boxes, Steel, 24x42-Inch	Each
65311	Pull Boxes, Steel, 24x48-Inch	Each
65410	Concrete Bases, Type 6	Each

65719	Traffic Signal Standards, Steel, 1.1 m	Each
65724	Traffic Signal Standards, Steel, 3.0 m	Each
65729	Traffic Signal Standards, Aluminum, 1.1 m	Each
65734	Traffic Signal Standards, Aluminum, 3.0 m	Each

Bid Items Retired - SI Metric (EAS Version 4)

<u>Item Number</u>	<u>Description</u>	<u>Unit</u>
30421	Asphaltic Pavement, Base Course	m ³
30422	Asphaltic Pavement, Base Course	Mg
50230	Protective Surface Treatment	L
50901	Preparation, Decks	m ²
62848	Silt Fence, Silty Soil, Delivered	m
62849	Silt Fence, Sandy Soil, Delivered	m
62850	Silt Fence, Silty Soil, Installed	m
62851	Silt Fence, Sandy Soil, Installed	m
64127	Sign Bridges, 6.1 m Span	Each
64128	Sign Bridges, 7.6 m Span	Each
64129	Sign Bridges, 9.1 m Span	Each
64130	Sign Bridges, 10.7 m Span	Each
64131	Sign Bridges, 12.2 m Span	Each
64132	Sign Bridges, 13.7 m Span	Each
64133	Sign Bridges, 15.2 m Span	Each
64134	Sign Bridges, 16.8 m Span	Each
64135	Sign Bridges, 18.3 m Span	Each
64136	Sign Bridges, 19.8 m Span	Each
64137	Sign Bridges, 21.3 m Span	Each
64138	Sign Bridges, 22.9 m Span	Each
64139	Sign Bridges, 24.4 m Span	Each
64140	Sign Bridges, 25.9 m Span	Each
64142	Sign Bridges, 27.4 m Span	Each
64143	Sign Bridges, 29.0 m Span	Each
64144	Sign Bridges, 30.5 m Span	Each
64145	Sign Bridges, 32.0 m Span	Each
64146	Sign Bridges, 33.5 m Span	Each
64147	Sign Bridges, 35.1 m Span	Each
64148	Sign Bridges, 36.6 m Span	Each
64160	Single Pole Sign Supports, One Sign	Each
64165	Single Pole Sign Supports, Two Signs	Each
64180	Overhead Sign Supports	Each
65835	Backplates, 1 Section, 300 mm Signal Faces	Each
65836	Backplates, 3 Section, 300 mm Signal Faces	Each
65837	Backplates, 4 Section, 300 mm Signal Faces	Each
65838	Backplates, 5 Section, 300 mm Signal Faces	Each
65839	Backplates, 300-200-200 mm Signal Faces	Each

ERRATA SHEET

Replace the errata sheet of Interim #1 to the Supplemental Specifications - 1998 Edition with the following:

Conversion Table (page 751):

Under the heading "Volume", change "millimeter" to "milliliter".
